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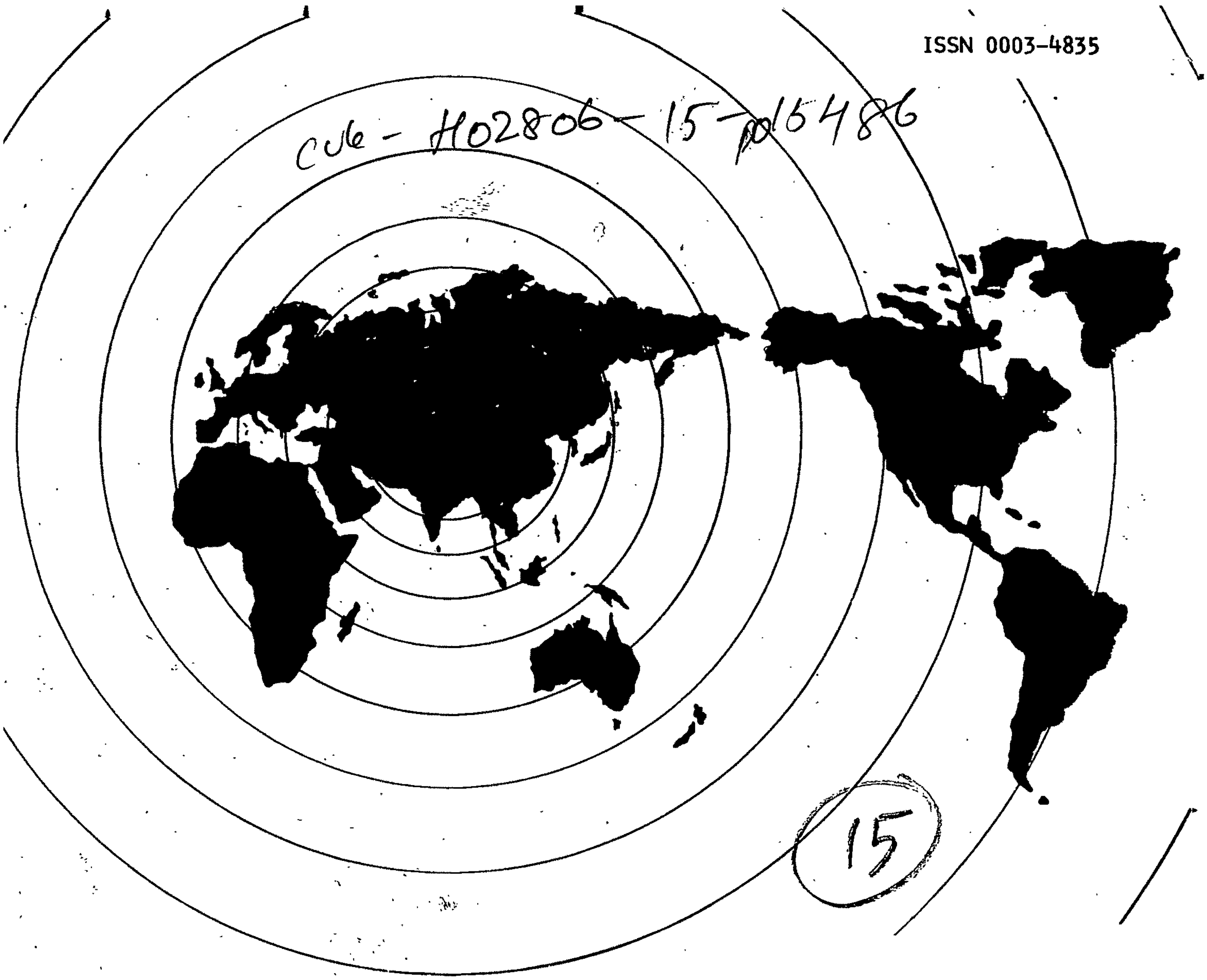

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HEADSHIP OF CIRCULATION: PROFESSIONALS OR SUB-PROFESSIONALS

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Examines circulation functions and the role of the professionally-qualified librarian in the circulation departments of Nigerian University libraries. A re-definition of circulation functions and staffing is suggested as a means of improving the performance of circulation services.

INTRODUCTION

It is usual in the library literature to depict the circulation service as an important component of the library and the circulation control desk as the library's nerve centre: "The circulation function of the library is so fundamental to library activity that one would define libraries in terms of circulation ..."[1] "It is a well-known fact that the effectiveness and, indeed, the usefulness of a library are measured primarily by its reading public by the services performed at the control desk."[2].

However, a thorough examination of the literature of this aspect of library service is revealing. While there is a considerable amount of published materials on charging systems, commensurate published attention has not been given to circulation functions and staffing patterns. The result of this seeming neglect of some of aspects of circulation work in the literature is that "the library administrator looking for a body of accepted practice as a theoretical framework for planning finds that none exists"[3].

This paper addresses itself to aspects of these often neglected issues of circulation service. Attention is focussed on functions of circulation departments in Nigerian university libraries. In the light of these functions an attempt is made to appraise the role of professional linrarian vis-a-vis the operational performance of the department. Data for the study were obtained by questionnaire survey method of the circulation departments in the thirteen university libraries in Nigeria as at the end of 1979. Eleven responses (85%) were received and incorporated in the study.

CIRCULATION FUNCTIONS

Respondents were asked to indicate the presence or absence of specific functions in their circulation departments and whether or not the department has full responsibility for such functions. Twelve functions were examined. These were as follows: User Orientation/instruction, reserve books, quick information service, in-depth information/reference service, inter-library loan, assistance to readers in the use of card catalogue, book selection, shelving of books, shelf-reading, formulation of circulation policy, enforcement of circulation regulations, and, of course registration of readers (Table 1).

Table 1, in the next page is self-explicit. Apart from the registration of readers, a function which is a full responsibility in all the cases responding, the departments have either full or partial responsibility for the other functions as shown in the last two columns of the table. Four respondents indicated, in the space provided, some other functions not specifically included in the questionnaire. These functions are as follows: photocopying service (three respondents), supervision of security staff (one respondent), and conducting authorised visitors round the library (one respondent). The respondents showed that the circulation departments have full responsibility for these functions.

As established in this survey, a functional profile of the circulation department in a university library is as follows. An average circulation department in a university library in Nigeria would, in descending order of importance, have full responsibility for registration of readers, reservation of books which in some cases may be located outside the circulation desk, enforcement of circulation regulations, shelving of books, and shelf-reading. In addition, it would have partial responsibility for formulation of circulation policy, book selection, user orientation/instruction, assistance in the use of card catalogue, inter-library loan, quick information service and in-depth information/reference service.

*Table 1: Functions of Circulation Departments**
(N = 11)

FUNCTION	NATURE OF RESPONSIBILITY	
	FULL(%)	PARTIAL(%)
1. User orientation/ instruction	2(18.2)	8(72.7)
2. Reserve book	10(90.9)	1(9.1)
3. Quick information service	4(36.4)	6(54.5)
4. In-depth information/ reference service	1(9.1)	4(45.5)
5. Inter-library loan	4(36.4)	6(54.5)
6. Assistance in the use of card catalogue	4(36.4)	7(63.7)
7. Book selection	1(9.1)	8(72.7)
8. Shelving of books	6(54.5)	5(45.5)
9. Shelf-reading	7(63.7)	4(36.4)
10. Formulation of circulation policy	1(9.1)	9(81.8)
11. Enforcement of circulation regulations	9(81.8)	2(18.2)
12. Registration of readers	11 (100)	

* *Detailed tabulation of individual responses is given in the Appendix.*

NATURE OF CIRCULATION STAFF

Table II reveals the number and categories of circulation staff members. The pattern highlighted from the Table is that in each of the circulation departments, there is likely to be one professional librarian and one sub-professional staff member. In one instance (Library II), there are two professional librarians in the circulation department while in Library XI there is no professional librarian at all. Library IV has three library officers while V, VI and X have none in the circulation department. The number of library assistants employed in the circulation departments varies considerably. While Library V has eighteen library assistants, X has just two. Library I and XI employ twelve library assistants each at the circulation department while II, III and VIII engage eight each. The average number of library assistants in the eleven circulation departments responding is nine. In the majority of libraries, no student assistants are engaged in the circulation departments. Only three respondents indicated that student assistants work in their circulation departments.

THE CIRCULATION HEADS

A section of the questionnaire centres on the qualifications and job positions[4] of heads of circulation departments. From the responses, one can see at a glance that the circulation head in the majority (91%) of libraries responding is a professional librarian who, in addition to a professional qualification in librarianship, normally holds a university degree in another field. The professional qualification in most of the cases, is the postgraduate diploma in librarianship. In two instances, the circulation heads hold a master's degree in librarianship; in one case the incumbent holds an A.L.A. The subject background is a first degree in the majority of the libraries, the subject studied are in the areas of the humanities and social sciences. In one instance the circulation head holds a law degree and in another case a combined degree in the natural sciences and education.

The job position of the circulation head is, in many (36%) of the libraries, librarian grade two. In three instances (27%), the incumbent is librarian grade one and two respondents (18%) indicated that the job title of their circulation heads is senior librarian.

There is only one instance in which the circulation department has a non-graduate non-professional head. The incumbent is a higher library officer and holds a sub-professional qualification in librarianship.

Table II: Staff of Circulation Departments

LIBRARY	PROFESSIONAL STAFF	LIBRARY OFFICER	LIBRARY ASSISTANT	STUDENT ASSISTANT
I	1	1	12	10
II	2	1	8	-
III	1	1	8	-
IV	1	3	11	1
V	1	1	18	7
VI	1	-	6	-
VII	1	-	5	-
VIII	1	1	8	-
IX	1	1	4	-
X	1	-	2	-
XI	-	1	12	-
TOTALS	11	10	94	18
ADJUSTED MEAN	1	1	9	6

These qualifications of circulation heads, in a way, reflect a widely held opinion in academic library circles in Nigeria: "Since about the mid-sixties an increasing number of Nigerian academic libraries have been insisting that their senior staff should possess both academic and professional qualifications"[5]. The academic background often stressed is at least a good university degree in a subject (or a combination of subjects) other than librarianship. This sort of background, the reasoning goes, is the natural springboard to professional education and a career in librarianship. This "good"? first degree plus a postgraduate qualification in librarianship ideal has not gone unchallenged. Equally vocal is the reasoning that a combination of one or two disciplines and librarianship at undergraduate level would produce a librarian who is sufficiently knowledgeable in another field[6]. However, from the evidence generated from the present investigation one is not in doubt that the usual qualification for a circulation head in Nigerian university libraries is a first university degree and a professional qualification in library studies. The crucial question, perhaps, is the role of the professional librarian in the circulation department. This is explored below.

THE CIRCULATION HEAD AND HIS WORKING TIME

Table III reveals how circulation heads distribute their weekly working time in the library. The total weekly working time is forty hours in each of the libraries. Since some of the respondents did not complete this part of the questionnaire the tabulation and discussion in this section are limited to eight respondents who supplied complete information. It is also probable that what these respondents supplied are estimates of how they utilise their working time. Nevertheless, considerable light is shed on how the circulation head spends his weekly working time.

The last column of the Table gives aggregate totals of time spent on the different duties by circulation heads of these eight circulation departments. An aggregate total of sixty-three man-hours is spent by the eight circulation heads on co-ordinating circulation services. This is followed by assistance to readers which takes fifty-five man-hours of the circulation heads' weekly working time. Planning the collection and analysis of circulation data take an aggregate total of thirty-three man-hours per week.

A close look at the columns shows the difference in the time spent on specific functions by the individual respondents. While respondent I allocates a total of sixteen hours per week to assistance to readers, respondent III allocates just four hours to the same function. For co-ordinating circulation ervices, respondent VI spends twenty hours per week, respon- ts I & VII six hours each and respondent IVonly three
This pattern of differences runs through the entire on of time among the various functions.

ttern of time allocation by two circulation heads, evident in the Table, merits further attention. One circulation head spends fourteen hours (about one third) of his/her weekly working time in the cataloguing department and the other thirty hours (three-quarters) of his/her time in the bibliographical services and serials work. In each of these two cases the circulation head spends a sizable amount of his/her weekly working time outside the circulation department. In fact, in the second case, the circulation head spends just ten hours per week for co-ordinating circulation services. This means, in effect, that for the most of the time the circulation department is not under his/her effective control.

THE PROFESSIONAL LIBRARIAN AND CIRCULATION FUNCTIONS

An examination of professional and non-professional nature of circulation functions is necessary for an assessment of the place of the professionally-qualified head in the department. Library functions are often classified as professional and non-professional duties. Both the United Kingdom Library Association[7] and the American Library Association[8] have categorised library duties in this fashion. However a close examination of the documents will reveal that the distinction between professional and non-professional duties is at times blurred. Nevertheless, they are helpful in categorising library duties. In essence the professional functions are "those whose adequate performance involves the ability to exercise independent judgement based on an understanding of the elements of library service — books, readers, and the means by which they are brought into effective relationship — and in addition a familiarity with specific library techniques and procedures"[9]. True, trained non-professional library employees can perform some of the functions calssified as professional. But adequate performance of professional duties "requires professional judgement and a thorough understanding of the principles and objectives of each duty and its function in relation to the overall purpose of libraries"[10]. Viewed from this perspective, the circulation functions of University libraries in Nigeria which can be classified as professional are as follows:

1. User orientation/institution.
2. In-depth information/reference service.
3. Book selection.
4. Assistance to readers in the use of card catalogues.

   This is considered a professional function at any level of responsibility since it often provides opportunity to explain the arrangement of the Card Catalogue and how it can be of use in exploiting library materials.
5. Formulation of circulation policy.
6. Supervising shelving duties.
7. Co-ordinating circulation services.

Table III: Weekly working time (in Hrs.) of circulation heads

FUNCTION	LIBRARY I	II	III	IV	V	VI	VII	VIII	TOTAL	ADJUSTED MEAN
1. Making rules & regulations for borrowing	1	4	2	6	-	-	2	-	15	3
2. Assistance to readers	16	6	4	10	5	6	8	-	55	8
3. Explaining lending rules	2	4	2	1	-	-	2	-	11	2
4. User instruction/ orientation	6	4	2	-	3	2	2	-	19	3
5. Interpreting rules	2	4	2	1	3	-	2	-	14	2
6. Maintenance of circulation rules	3	4	10	1	-	-	6	-	24	5
7. Planning the collection & analysis of circulation data	3	4	3	1	9	10	3	-	33	5
8. Registration of readers	1	3	1	1	3	-	2	-	11	2
9. Maintaining interloan records	-	-	2	1	4	2	1	-	10	2
10. Collecting & recording statistics	-	3	2	1	3	-	6	-	15	3
11. Co-ordinating circulation services	6	4	10	3	4	20	6	10	63	8
12. Processing materials for binding	-	-	-	-	4	-	-	-	4	4
13. Keeping photocopy records	-	-	-	-	2	-	-	-	2	2
*14. Cataloguing & classification	-	-	-	14	-	-	-	-	14	14
*15. Bibliographical services & serials work	-	-	-	-	-	-	-	30	30	30

**Functions performed in other Departments of the Library*

The circulation functions which are classified as sub-professional or clerical include the following:

1. Quick information service — where the information required is simply directional or involves simple use of catalogues or periodical indexes for publication data (author, titles, etc.).
2. Registration of readers.
3. Issuing, renewing, reserving and discharging material.
4. Shelving and filing.
5. Maintaining circulation and inter-library loan records.

In the context of this classification of circulation duties, there appears to be considerable room for a professional librarian in the circulation department. He seems to have useful professional functions to occupy most of his working time. In fact Table III made it clear that the three functions that take the greatest amount of the circulation heads' weekly working time — co-ordinating circulation services, assistance to reader and planning the collection and analysis of circulation d are professional ones. This, in a way, provides justificat the presence of professional librarians in the circulation departments, usually as circulation heads. The situation in Nigeria as characterised in this study would seem to be at variance with the findings of Laurace Miller who expressed the fear that "a substantial number of professional staff are being employed in less than professional work"[11] in the circulation departments of the U.S. University libraries.

However, it seems the basis for allocation of functions to the circulation departments in Nigerian University libraries is considerably blurred. There does not appear to be definite classification of duties performed, scope of responsibility, and qualifications needed for successful performance of such duties. For instance, one wonders why the circulation department should have any responsibility for in-depth reference/information service in a library that has a thriving reference department. Much of the professional functions in the circulation department can, perhaps, be adequately contained elsewhere in the library. If this thesis is accepted, a critical sifting of circulation functions with a view to reducing its professional component will not be damaging to the operation of the department.

This exercise will, hopefully, leave the circulation department with essentially circulation functions: these include registration of readers; maintaining registration records; issuing, renewing, reserving, receiving and discharging materials; and, perhaps, photocopying service. This type of arrangement will have obvious implications.

There will probably be no need to deploy a professional librarian to the circulation department. This approach will, in a way, obliterate the impasse created by controversial views about the role of the professional librarian in the library -- a controversy that is, perhaps, most manifest in the circulation department. On the one hand is the contention that Nigerian librarians "allow themselves to be saddled with much of the routine and clerical duties which could conveniently be left to juniors"[12]. Osundina's injunction is, perhaps, more controversial" ... the librarian will have to stop filing cards, must stop supervising clerks or attendants, dealing with fines and overdue notices and he should not direct readers to the shelves any more ..."[13] for these and similar functions are non-professional. On the contrary there is the reasoning that views such as the above are mere manifestations of elitist tendencies and that librarians should not isolate themselves from such functions if the library is to provide meaningful service[14]

One might question the place of these view-points in real working situation. The fact is that somehow they affect the performance behaviour of the professional man or woman in the circulation department. As such it is, perhaps, incum- t on the library administrator to take cognizance of them ising the effectiveness of the department.

the suggested re-definition of circulation functions, ill be paved for deploying well-qualified sub-pro- substantive circulation heads, reporting, perhaps, to heads of reader services. The effectiveness of circulation services is not necessarily measured by its role in in-depth information service or book selection. In the judgement of the writer their effectiveness depends on promptness and exactitude with which they deal with registration of readers, charging of books, keeping of circulation records and files and shelving of books. These functions will, hopefully, ensure that books can be found in their right places on the shelves when they are wanted or can be properly accounted for if they are not there.

The qualifications required for these duties include good educational background, dedication, ability to get things done, and ability to meet and get along with people. The sub-professionals or library officers (as they are known in Nigeria) possess these qualifications. Usually they have received two-year full-time sub-professional education in library studies at university-based library schools and have had several years of working experience in libraries. They are well versed in library processes. With competent ones among them as substantive circulation heads much of the backlog in at least some of the circulation departments will considerably ease.

Already there are indications that this approach is feasible. In one university library (Table II), the effective circulation head is a library officer; in some other cases this cadre of library staff is known to be the moving force in the circulation department. Also in two libraries (Table III), the professional circulation heads spend considerable length of their weekly working time outside the department. Further, in virtually all the cases the circulation heads have their offices outside the circulation desk. What is suggested is for the professional librarian to be withdrawn completely from the circulation department.

The professional librarian loses nothing in the process. He will be re-deployed to another department of the library where, hopefully, his subject background will be put to a better use.

At the same time the arrangement provides an avenue for the full utilisation of competent sub-professionals or library officers. Possible appointment as heads of circulation department will, in all likelihood, enhance the career structure and job satisfaction of this cadre of personnel in academic libraries. They are likely to accept such appointments as a challenge and will probably take pride in the smooth operation of circulation duties.

CONCLUSION

It seems appropriate to end this paper with a note on the generalizability of this report. The analyses and the coresponding discussion are essentially based and therefore essentially limited to the situation in the circulation departments of the libraries responding. These are the circulation departments of the university libraries at Ibadan, Nsukka, Lagos, Ife, Zaria, Benin, Ilorin, Jos, Calabar, Maiduguri and Port Harcourt. Nevertheless the content of this paper by extension, has considerable applicability to similar circulation departments in all the university libraries in Nigeria.

REFERENCES

[1] Atkinson, Hugh C. Circulation -- an overview. Advances in Librarianship, Vol. 4. New York, Academic Press, 1974, p.63.

[2] Addedeji, Adelabu. Some thoughts on book circulation in university libraries. Nigerian Libraries 1973, 9(1-2), 18.

[3] Miller, L.A. The role of circulation services in the major university library. College and Research Libraries 1973, 34(6), 45-53.

[4] For grades of university library staff in Nigeria *see* Nwafor, B.U. A comparative analysis of selected advertisements for senior staff positions in Nigerian academic libraries. Nigerian Libraries 1973, 9(1-2), 68-9.

[5] Nwafor, B U. A comparative analysis of selected advertisements for senior staff positions in Nigerian university libraries. Nigerian Libraries 1973, 9(1-2), 70.

[6] See for example; McCarthy, Cavan. Nigeria -- with qualifications. New Library World 1974, 75, 173-4.

[7] Library Association. Professional and non-professional duties in libraries ... 2nd ed. London: Library Association, 1974. 86p.

[8] American Library Association. Descriptive list of professional and non-professional duties in libraries ... Chicago: A.L.A., 1948. 75p.

[9] *Ibid.*, p. vi.

[10] Library Association *Op. Cit.*, p.8.

[11] Miller, L.A. Changing patterns of circulation services in university libraries. Ph.D. Thesis. The Florida State University, 1971, p.120.

[12] Onyechi, N.I. Full academic status for Nigerian academic librarians through the divisional library/subject specialist plan. Libri, 1975, 25(3), 184.

[13] Osundina, O. Academic status for university librarians: What it takes. Nigerian Libraries, 1972, 8(2), 120.

[14] Amosu, Margaret. A university library in a developing country: its characteristics and problems as demonstrated in Nigeria. M.L.S. Dissertation, Loughborough University of Technology, 1977. 80-95.

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APPENDIX: TABULATION OF CIRCULATION SERVICES

	FUNCTION	UNIVERSITY LIBRARY I	II	III	IV	V	VI	VII	VIII	IX	X	XI	TOTAL F(%)	p(%)
1.	User instruction/ orientation	p	-	p	p	p	p	p	p	F	F	p	2(18.2)	8(72.7)
2.	Reserve book	F	F	F	p	F	F	F	F	F	F	F	10(90.9)	1(9.1)
3.	Quick information service	p	p	F	p	-	p	F	p	F	F	p	4(36.4)	6(54.5)
4.	In-depth information/reference service	-	p	-	-	-	p	F	-	p	p	p	1(9.1)	4(45.5)
5.	Inter-Library loan	F	-	p	F	p	p	F	F	p	p	p	4(36.4)	6(54.5)
6.	Assistance in use of card catalogue	F	p	p	p	p	p	F	p	p	F	F	4(36.4)	7(63.7)
7.	Book selection	-	-	p	p	p	p	p	p	p	F	p	1(9.1)	8(72.7)
8.	Shelving of books	p	F	p	F	p	p	F	F	p	F	F	6(54.5)	5(45.5)
9.	Shelf-reading	p	p	p	F	F	F	F	p	F	F	F	7(63.7)	4(36.4)
10.	Formulation of circulation policy	p	-	p	p	p	p	p	p	F	p	p	1(9.1)	9(81.8)
11.	Enforcement of circulation regulations	F	F	F	F	p	p	F	F	F	F	F	9(81.8)	2(18.2)
12.	Registration of readers	F	F	F	F	F	F	F	F	F	F	F	11(100)	-
13.	Others.													
a.	Conducting authorised visitors round the library			F										
b.	Supervision of security staff			F										
c.	Processing materials for the bindery							F						
d.	Photocopying service							F	F			F		

F = Full responsibility

p = partial responsibility

- = Service not responsibility of circulation department

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INFORMATION NEEDS OF INDIAN INDUSTRY

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Based on the queries received by the Industrial Information Service (IIS) of the Publications & Information Directorate (PID), New Delhi, an attempt has been made to analyse the information needs of Indian industry and to identify the types of industrial information frequently sought after by it.

INTRODUCTION

Information is an important resource in the creation, maintenance and development of any industry. It is a commodity which attains its true value to society only when it is utilized in the production of goods and generation of services. However, in spite of these facts, so far little or no effort has been made to study the information needs of the Indian industry.

As the amount of information service utilized by a given industry or technology is a measure of technological excellence and degree of industrialization of a nation, such studies may prove helpful in the evaluation of the same. Moreover, they will help in planning and designing of the future information services and centres, in undertaking user studies and strengthening the existing services and centres.

Since 1977, PID has been rendering industrial information service under which technical enquiries pertaining to technology, R&D, and techno-economic data relating to number and distribution of manufacturing units, installed capacity, production, demand, consumption, imports and exports are being attended to. In this paper efforts have been made to have a rough idea of the information needs of the Indian industries as revealed by the queries received at PID.

For the study a period of last 4 years, i.e. 1978, 1979, 1980 and 1981 (up to September), has been chosen. Only postal requests have been taken into consideration though IIS has been receiving a good number of visitors as well as telephonic queries. The study is confined to Indian queries only though queries from neighbouring countries like Nepal or from various international organizations like UNIDO are also received.

It has been found that on an average one letter contains enquiries on more than 2 topics. And, under each topic information is invariably sought on at least 3 aspects of a product, process or the like, e.g. one may require information on manufacturers of any product with their addresses, capacity, production, export and import figures.

There has been a gradual increase of postal queries. In 1978 IIS received only 17 letters. In 1979 there were 26 whereas in 1980 their number reached 55. In 1981, up to the end of September, there were 58 letters. For the convenience of discussion information sought on one aspect of any item is taken as one query.

USERS

In general, the industrial information seekers are supposed to be industrialists from medium and small scale sectors and prospective enterpreneurs. However, the detailed analysis of the users of IIS is given below.

It is generally not possible to divide the industries into large, small, medium or cottage industries without knowing their capital investment. Nevertheless, fair guesss can safely be made. Most of these queries are found either from small scale industries or from medium ones. Queries on craft-based industries were only two. Important among the large scale units were: (i) Dalmia, (ii) J.K. Synthetics, (iii) Kusum Products, (iv) Amer Dye-Chem Ltd, (v) Calico, and (vi) Hoechst.

There were also a few queries from public sector undertakings. However, industrialists community is not the only one that uses IIS. The clientele of IIS are a large group of people who are either interested in or related to the industrial production or in its development. In the present study, such users are divided into: (i) prospective enterpreneurs, (ii) industrialists, (iii) consultants, (iv) students/teachers, and (v) institutions or organizations.

As mentioned earlier, the industrailists were mostly smaller or medium entrepreneurs. Among the large and medium industralists, as appeared from their letters, most of the people were interested in the diversion of their enterprise.

In 1978, there were 5 queries from prospective entrepreneurs, 8 from the industrailists, and only 4 were institutional queries. Presence of the other groups of users was missing. In 1979, queries from prospective entrepreneurs, industrialists, consultants, and institutions/organizations were 6,9,2 and 4 respectively. In 1980, number of queries received from the users mentioned above were 11, 20, 3 and 10. Besides, 6 were students, and in 2 queries the enquirers had not disclosed their clear-cut identity. In 1981, there were 27 queries from prospective entrepreneurs, 50 from industrialists, one from a consultant and 20 from the student or teacher community. Besides, there were 4 institutional queries.

The above analysis shows that maximum number of information users are those who are already in the field, next close to them are those who intend to start a venture.

INDUSTRY-WISE DEMAND FOR INFORMATION

Before coming to the nature of queries, let us discuss the industry as a whole to which various queries are pertaining. In grouping the industries no standard classification procedure is followed. All the industries are first divided into 4 broad groups, viz. (i) engineering, (ii) chemical, (iii) miscellaneous, and (iv) craft-based industries.

The miscellaneous industries group covers the entire food industry; vegetable oils, soaps, varnish and paints; cement and concrete, asbestos, etc.; glass, ceramics and refractories; wood and timber industry; paper and paper board; plantation and agro-based industry; textile industry; leather industry; and others. Other 3 groups are self-explanatory.

The engineering industry is further divided into: metal and metallurgical industry, electrical industry, electronics, transportation industry, industrial machinery, machine tools, instruments, office and household equipment, power and energy, and other plant and equipment.

Similarly, the chemical industry is divided into: inorganic chemicals; organic chemicals; fine chemicals; petrochemicals; fertilizers; pesticides; dyestuffs; drugs and pharmaceuticals; plastics, polymers and synthetic rubber; synthetic detergents; perfumery and glycerine.

In 1978, there were only 3 queries on engineering industry (on plant and equipment). In 1979, besides 2 queries on plants and equipment, 2 were on metal and metallurgical industry and one each on electrical industry and electronics.

In 1980, there were one query on metal and metallurgical industry, 5 on electrical, 2 on electronics, one on transportation, 7 on industrial machinery, 3 on various plants and equipment and 2 on equipment used for power or energy generation.

In 1981, queries on metal and metallurgical industry reached 5, while there were only 3 on electrical industry and none on electronics. Query pertaining to the transportation industry was only one. There were 2 queries on industrial machinery, 3 on office and household equipment, 2 on plants and equipment and 4 pertaining to energy and power generation.

With this study nothing can be said about the information demand trend of engineering industry. It appears from this that there is not much demand for the information in Indian engineering industry in general.

On chemical industry, in 1978 there were only 7 queries (one each on fertilizer and pesticide, 3 on inorganic chemicals and 2 on organic chemicals). In 1979 also position was more or less the same. There were 3 queries on plastics, polymers and synthetic rubber; and 8 on organic chemicals. However, there was a slight improvement in 1980 with one query each on fertilizers, pesticides and dyestuffs; 2 on drugs and pharmaceuticals; 5 on plastics, polymers and synthetic rubber; 10 on inorganic chemicals; 8 on organic chemicals; and 3 on fine chemicals. In 1981, the position was almost similar to that of previous year with one query each on fertilizers, drugs and pharmaceuticals, synthetic detergent and perfumery; 2 on plastics and polymers; 6 on inorganic chemicals; and 24 on organic chemicals.

It can be safely inferred from this analysis that there is a growing demand for both inorganic and organic chemicals.

On miscellaneous industries, there were 10 queries in 1978 (one each on soaps; leather; paper and paper board; glass and ceramics: and agro-based industries; 3 each on cement and garment industry). In 1979, there were only 8 queries on this group of the industry. They were on food industry (1), lime (4), zip fastner (1), tobacco (1), activated carbon (1), etc.

In 1980, there were a good number of queries on cement (2), food industry (2), vegetable oils and soaps, etc. (2), glass, ceramics and refractories (1), agro-based industries (4), textiles (3) and others (7). On the last item products like distemper, meat, yeast, etc. were there.

There seems to be sufficient increase in the number of queries in the year 1981. There are queries on cement and its pipes (6), bakery (3), vegetable oils etc. (2), soaps (6), leather industries (1), paper and paper board (7); agro-based industries (2). Besides, there were 10 queries pertaining to items like activated carbon, camera, film carbon, absorbent cotton, confectionery, wax and glue, polish, etc.

On the basis of this study, cement and paper industry are the only two major industries on which our entrepreneurs are more interested.

During this entire period there were only 2 queries pertaining to craft-based industry. These were match and agarbatti industry. It is quite likely that craft-based industries are banking for their information demand on the Khadi & Village Industries Commission.

TYPES OF INFORMATION NEED

Industrial information itself is a broad-based topic. Naturally, all sorts of queries are pouring into the IIS which can be divided into following groups: (i) techno-economic (including market information), (ii) technological, (iii) request for bibliographies, (iv) regulatory, (v) managerial,(vi) financial, (vii) referral types, (viii) consultancy, (ix) queries on machinery and equipment, (x) on training, (xi) on published products, and (xii) miscellaneous types. Their detailed analysis is presented in the following paragraphs. However, the study does not reflect the true picture of the information demand on topics which are not covered by IIS, e.g. information on patents and standards.

The techno-economic group is very vast one. It may even include market information and any other information on financial aspects. In the present discussion market information will be discussed separately.

Techno-economic queries can further be sub-divided into: (i) manufacturers and their addresses and numbers; or suppliers of any product, raw material or machinery, or address of any organization, (ii) capacity (both licensed and installed), (iii) production figures, (iv) target, (v) demand, and (vi) future scope. Besides, quite often queries are received on raw material and its availability, total licenses and letters of intent issued, users, capital involved, supply-demand gap and economic size of the project. Sometimes, vague information like present status of particular industry or techno-economic information on certain topics is sought after.

The number of queries falling in the first sub-group in 1978, 1979, 1980 and 1981 was 6, 12, 41 and 73 respectively. Maximum queries were on manufacturers, requests for information on suppliers at second place, while requests for organizational information were only 9 throughout the period under review.

In 1978, there was no query on capacity. In 1979 number of such queries was 18 which went to 22 in 1980 and 41 in 1981. Similarly, requests for information on production during the same period were 3, 12, 16 and 42 respectively. There was no query on consumption in 1978, in 1979 there were only 2, in 1980, 7 and in 1981 there number went up to 32.

As regards demand, both present and future demand of the products are sought. Number of such queries during 4 years was 3, 9, 19 and 46 respectively. On future scope of the various products there were only 8 requests in 1980 and 5 in 1981. On involvement of the capital 2 queries were in 1979, 8 in 1980 and 5 in 1981 while on economic size of the project one each was in 1980 and 1981. Besides, there was some stray queries during the whole period on topics like target (1), raw materials (3), licenses and letters of intent (6), users (6), present status (6), techno-economic information (5), and supply and demand gap (1).

Queries on market information can be divided into: (i) export and import data, (ii) prices, and (iii) market potential (both internal and external market). 'Demand' has been covered under techno-economic information, though it could have come under this category also.

Requests for export data were 3, 2,12,and 25 respectively during 1978, 1979, 1980 and 1981. Similarly, queries on import data during these years were 3, 6, 15, and 31 respectively. Information sought on prices was not much. There was only one request in 1978, 2 each in 1979 and 1980 and 21 in 1981. 'Market potential' is an important part of this category of information. However, there was only one query on it in 1978, 2 in 1979, 10 in 1980 and 9 in 1981. There was only one query throughout the period on importers.

Technological information has the third place on the basis of present information demand pattern. Queries falling under this category can be sub-divided into (i) technology, R&D or know-how, (ii) processes and products (both new and old), (iii) patents and specifications.

Under the first group there were 6, 7, 5 and 19 queries in 1978, 1979, 1980 and 1981 respectively. Out of these queries there were 9 queries which can be put under rural technology. They were mostly pertaining to waste utilization.

On processes, which includes process know-how and process details, there were 6, 4 and 10 queries during 1979, 1980 and 1981.

In the case of machinery and equipment the requests were varied, i.e. on suppliers of machinery, equipment and their parts, list of machinery needed or workability of plant capacity and minimum economical capacity of plants. Such queries were not many, i.e. only 11 during the 4-year period, mostly in 1981.

Besides, there were 4 queries on technology suppliers or technical information suppliers, 4 on patents and one on specifications.

It can be inferred that maximum queries in this group are on technology or know-how which includes process details also.

Many people are interested on the printed publications on a particular product like books, surveys, schemes, feasibility reports, project reports, profiles, etc.

There were 18 queries on literature (printed materials like books, etc.) in 1978, and only one in 1979, 8 in 1980, and 18 in 1981. On schemes, feasibility reports, project reports, project profiles, and surveys there were 3 requests in 1978, 3 in 1979, 7 in 1980 and 5 in 1981. Demand for profile does not seem to be much, as only one each was asked for in 1979 and 1981 and 4 in 1980. This shows that only documents like feasibility reports or project reqports are in demand.

It seems demand for bibliographies on industrial topics is less in comparision to other R&D topics. There were only 2 such request, in 1979, 4 in 1980 and 22 in 1981. These were mostly for bibliographies on particular topics, e.g. energy, fine chemicals, fibre glass, etc.

There were a few consultancy type queries also which had either sought the technical assistance in setting up the industry or solving some specific problem, or advice on one or the other topic. Number of such queries in 1978 was only 2, 3 in 1979, 8 in 1980 and 10 in 1981.

There has been a negligible demand for regulatory information as only 4 such queries were received in 1980 and 3 in 1981. Same is the case with managerial information and information on training aspect where there was only one request in each category. The referral type queries were also not many (one each in 1978 and 1979, and 4 each in 1980 and 1981).

Nobody was found interested in background information during this entire period.

Besides all these queries, there were a few vague requests for supply of information like every detail of a product or complete information on it, latest information on various aspects of a industry, employment potential, profit-loss analysis, main consumers of the product, etc.

CONCLUSION

It can safely be concluded that: (i) among the users of information service, the small and medium entrepreneurs are in majority, (ii) maximum queries emanate from chemical industry, and (iii) there is maximum demand for techno-economic information like manufacturers of any product, its capacity, production, demand, and export and import data.

*Vox audita perit, littera scripta manet**

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*The spoken word perishes, the written word endures

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TOWARDS BIBLIOGRAPHICAL CONTROL OF INDIAN AGRO-BIOLOGICAL LITERATURE

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Source of Indian Agro-biological literature and their generating points are outlined. Necessity for making the Indian Agro-biological literature available at one place is stressed. Important International and Indian documentation agencies are described. An attempt made at the Marathwada Agricultural University Library, Parbhani (Maharashtra) towards the bibliographical control of Indo Agro-biological literature is explained. Bibliographical Research Cell set up at this library in collaboration with Senior Scientists and library's professional staff prepared an information file and also published 7 documentation projects on various subjects of Agriculture. The detailed holdings of the information file are presented in the table. The published documentation projects have also been enlisted.

1. SOURCE OF AGRO-BIOLOGICAL LITERATURE

After Independence, agricultural research has received paramount importance which geared up many published and unpublished sources of information. There are now 23 Agricultural Universities, 105 agricultural colleges, 24 veterinary colleges, about 20 Home Science colleges and a few colleges of Agricultural Engineering and Food Technology. In addition there are about 24 Research Institutes under the administrative control of Indian Council of Agricultural Research (ICAR), about 80 All India Co-ordinated Projects of Research sponsored by the ICAR. In addition to these there are some independent State Research Institutes conducting research in agro-biological areas. All the traditional universities do conduct research pertinent to Agro-biological areas. At BARC, research on nuclear energy in relation to agriculture is being done. Botanical Survey of India, Zoological Survey of India, and Geological Survey of India carry out surveys and publish information some of which are of interest to Agro-biological workers. The Central Water & Power Commission and the Indian Meteorology Department are also contributing further to the interests of Indian Agriculture. All these comprise the generating points for Indian Agro-biological literature. Coming to sources of literature, journals comprise the major portion as primary source of information. Secondly, the books; the reports; the technical bulletins; the proceedings of symposia, workshops, conferences etc; the Newsletters; the Newspapers; the brochures etc. add to the primary sources of infomation. Secondary sources like bibliographies; indexes; abstracts; reviews etc. form the other major sources citing the primary sources. Apart from this, microforms; audiovisual and computer readable forms occupy predominant place as literature sources.

2. BIBLIOGRAPHICAL CONTROL OF INDIAN AGRO-BIOLOGICAL LITERATURE

2.1 *International documentation agencies on world agro-biological literature*

2.1.1 *Biosis through biological abstracts*

The Bio-Science Information Service of the Biological Abstracts, the United States based documentation agency, is the major service in the world which publishes the Biological Abstracts and Bio-research Index. As per the 1980 BIOSIS List of Sources of the Database, out of 5,858 journal sources it covers 220 Indian journals. This is only about the Indian journals. Indian work is published in journals other than that of Indian origin. As per a recent survey Biological Abstracts cover 42.6 per cent of Indian work as quoted by Banerjee et al..[1].

2.1.2 *Bibliography of Agriculture*

This is a documentation service of U.S. Department of Agriculture, published monthly. This bibliography consists chiefly of journal articles which are approximately 120,000 per year. There is no information regarding Indian coverage.

2.1.3 *CAB Abstracts of Commonwealth Agricultural Bureaux*

CAB as an effective clearing house for the collection, collation and dissemination of information of significance to agriculturists all over the world. The Bureaux select from world literature the information on significant advances in each particular branch of agricultural sciences. This is published in the form of 42 abstracting journals. According to a recent survey, 70.3 per cent of Indian work on Agro-biological areas is covered by the CAB group of journals[1].

2.1.4 *AGRIS (The International Information System for the Agricultural Sciences and Technology*

AGRIS began to operate formally in Janaury 1975. This documentation project was established through the co-operation of the FAO (Food and Agricultural Organization of the United Nations) with various Governments and institutions for the purpose of generating data bases which would include references to current literature collected from information generators throughout the world with reference to research and development in the areas of food, agriculture and related sectors. India is also a contributing member for the AGRIS and the Director of the Institute of Agricultural Statistics, ICAR is the Liaison Officer for this purpose. Figures regarding Indian Agro-biological literature covered by AGRIS are not available.

2.1.5 *Other foreign documentation agencies in agricultural sciences*

PUDOC (The Centre for Agricultural Publishing and Documentation of the Netherlands), IRRI (International Rice Research Institute, Philippines),CIMMIT (Centro International de Mepramiento de Maizy-Trigo, Mexico), IITA (International Institute of Tropical Agriculture, Ibadan, Nigeria), CIP (International Potato Centre, Peru), CIAT (Centro International de Agricultural Tropical, Columbia), ILCA (International Livestock Centre for Africa) etc. are worth mentioning but the information about Indian work covered by these agencies is not available.

2.2 *Indian documentation agencies in agricultural sciences*

2.2.1 *Indian Science Abstracts of INSDOC*

The INSDOC's Indian Science Abstracts though covers Indian agricultural literature, the coverage is not comprehensive. As per a recent survey the coverage of Indian Agricultural literature in Indian Science Abstracts is 42.2 per cent[1].

2.2.2 There are many agencies bringing out Documentation services in very limited sphere. Some of them are: Fertilizer Association of India, FAI Abstracts; The Central Power and Irrigation Abstracts brought out by Central Board of Irrigation and Power; many Universities are bringing out Documentation bulletins and bibliographies; UAS Bangalore Bibliographical Series is worth mentioning. ICRISAT, an international institute established in India has an Information Centre under the title SMIC. It is still in a formative stage. This of course will have coverage of world literature on the crops of ICRISAT's orbit.

3. NECESSITY

It is said that there exists a wide gap in India between the users of the agricultural information and the generating system of this information. To visualise more precisely, the generating system is at one side and the users are at the other side. In between them the communication media to provide an effective interlinking process is not adequate. Many agricultural workers feel that the Indian works if made available at one place in a quickly retrievable form, would be of great help in locating the specific problems and in avoiding the duplication of research potential. According to some specialists 30 to 40 per cent of a research worker's time is devoted towards literature search and study. Libraries are normally the browsing grounds of the research workers for such activity. Libraries do offer local documentation services which reflect their resources and help to know what they possess. But to know the unavailable Indian information there is no comprehensive outlet.

4. AN ATTEMPT

In 1976, at the Marathwada Agricultural University, Parbhani (Maharashtra), an initiative was taken to set up a Bibliographical Research Cell in the University Library in collaboration with Senior Scientists of the University. This activity started with the sole aim of enriching the library collections by filling up the gaps and adding new journals and other sources. This exercise was aimed at creating a pool of Indian literature. The efforts have been started in this direction. Later it was thought to prepare exhaustive bibliographies in different aspects of Agriculture. At this stage, lead was taken from the library and an Information file of Indian work was maintained. As an experiment, last 10 year's work was collected and compiled starting with Horticultural Sciences. Later on similar efforts were made to collect and compile the Indian work on Soil Sciences. In Horticulture, two separate files are maintained, one for references to literature and the other for references with abstracts to literature. Entries are made on loose paper slips and filed in cardboard boxes. Organization of references is made in four levels, (i) Crop level, (ii) Subject level, (iii) Chronological level and (iv) Alphabetical level. All the references in crop level are classified by the Dewey Decimal Classification, 18th edition. All the references of a particular crop are classified by the selected subject headings both major and minor, prepared in consultation with the senior scientists. References of a particular subject heading are classified further by the year of publication of the work and arranged in a chronological sequence to assist the users in year-wise approach. The references under a particular year are classified by the surname/popular name of the author of the work and arranged in one alphabetical sequence. In a few cases the alphabetization was carried to titles of the work. In the case of Soil Sciences, the references are grouped into 12 major areas of Soil Sciences. Under each area the references are classified first chronologically by the year of publication of the work, and secondly under a particular year alphabetically by the surname/popular name of the author. Thus the work started with two branches of Agriculture and now it is streamlined under four pannels, (i) Horticultural pannel, (ii) Agronomy pannel, (iii) Crop protection pannel, and (iv) Soil Science pannel.

4.1 *Holdings of the information file*

The detailed holdings of the information file have been presented in the Table. The information regarding the period of coverage, number of sources scanned and the number of items collected is furnished.

Table: Holdings of the information file as on 1.1.1982

Sl. No.	Subject	Period of coverage	References collected	Abstracts collected	Sources scanned (excluding theses)
1.	Fruit crops	1966-81	4,897	-	181
2.	Vegetable crops	1966-81	4,667	-	181
3.	Floriculture	1966-81	2,216	-	181
4.	Soil Sciences	1966-77	3,767	-	91
5.	Pulses	1966-80	2,357	-	125
6.	Oil seeds	1966-81	3,450	-	125
7.	Weed Science	1950-81	-	2,414	221
8.	Viticulture	1900-81	-	1,432	196
9.	Sugarcane	1950-82	-	593	45
10.	Seed Science & Technology	1950-82	-	21	1
11.	Pesticides	1960-82	3,393	-	181
12.	Farm Management	1950-82	-	560	25
			24,747	5,020	

As seen in the table, the holdings of the information file as on 1.1.1982 consist of 24,747 references and 5,020 abstracts.

4.2 *Access to information file*

The file is maintained only for official use. Users of the library are not allowed to have direct access to the file. Their demands for literature are attended to and they are being provided with bibliographies on their topic. Abstracts are also supplied on request.

5. PUBLICATIONS

Owing to paucity of funds at the disposal of the library and lack of proper facilities for printing, private publishers were approached for getting the bibliographies published for wider use. The following bibliographies have been brought out.

5.1 *Indian Horticultural Literature: Vol. 1, Fruit Crops (1966-1977) a select bibliography. Gurgaon: Indian Documentation Service, 1980. 439p. Rs.200/-.*

It is a bibliography of references to journals, proceedings of symposia, conferences, theses submitted to Indian universities, 3,497 references of 68 crops make it a comprehensive tool. A detailed subject index is provided.

5.2 *Indian Soil Science Literature (1966-1977) a select bibliography. New Delhi: Agricole Publishing Academy, 1981, 501p. Rs.200/-.*

It is a bibliography of references to journals, proceedings of workshops, conferences; theses submitted to Indian Universities. 3,767 references grouped under 12 areas of soil science with Author and Subject indexes make it a good reference tool in Agriculture.

5.3 *Indian Liteature on Vegetable Crops (1966-1980) a select bibliography. New Delhi: Metropolitan Book Co., 1981, 558p. Rs.200/-.*

It is a select bibliography of references to journals, proceedings of workshops and symposia and theses of Indian Universities. 4,209 references of 52 vegetable crops make it a comprehensive reference tool. Author and subject indexes are provided.

5.4 *Indian Literature on Pulses (1966-1980) a select bibliography. New Delhi: Metropolitan Book Co., 1981, 407p. Rs.200/-.*

It is a select bibliography of references to journals, proceedings of workshops, and symposia and also theses of Indian Universities. It lists 2,357 references on 20 crops. Author and subject indexes are also provided.

5.5 *A Compendium of Weed Science Research: 1950-1981. New Delhi: Metropolitan Book Co. (in press). Rs.450/-.*

This work is presented in two volumes, Vol.1, Weed control in crops, Vol. II, Weeds and weedicides. 2,414 abstracts with references makes it an authoritative information source book on Indian Weed Science Research. Under part II of each volume four Indexes are provided, (i) Source index, (ii) Systematic weed index, (iii) Subject index and (iv) Author index.

5.6 *Eighty Years of Grape Research in India: Abstracts of literature, 1900-1981. New Delhi: Metropolitan Book Co. (in press). Rs.350/-.*

This work encompasses almost the entire Indian research work published in Indian as well as foreign journals; in the form of abstracts. About 1,400 abstracts on a single fruit—Grapes makes it a valuable reference source book. Under Part II three indexes are provided, (i) Source index, (ii) Subject index, and (iii) Author index.

5.7 *Indian Literature on Oil seeds 1966-1981, a select bibliography. New Delhi: Metropolitan Book Co. (In press). Rs.200/-.*

It is a bibliography of references to journals, proceedings of workshops and symposia and theses of Indian Universities. About 3,500 references on oil seed crops grown in India makes it a useful reference guide to literature. Author and subject indexes make it doubly approachable -- Author-wise as well as keyword-wise which are derived from the titles arranged crop-wise.

5.8 *Works under compilation*

The Bibliography on Floriculture and Pesticides is in progress which will be sent to press in a few months. The compilation of Abstracts of Literature on Sugarcane, Seed Sciences & Technology and Farm management have been started. This will go to press in 1983. Plans to compile the abstracts of literature on cotton and groundnut are now under active consideration. Abstracts of literature on all fruit crops on the lines of Grape Research will be compiled soon.

6. CONCLUSION

It has taken 6 years for collecting 24,747 references and 5,020 abstracts on 12 subjects of agriculture and to publish 7 projects. This is only about the Indian agrobiological work. At this stage the author can neither claim the comprehensiveness of these works nor can write, atleast the attempt is partially comprehensive. This is only a human effort. This may be a parameter to assess the amount of Indian work published and unpublished. The following conclusions may be drawn from the experiences.

1) There is great scope and also necessity for making available the entire Indian work at one place in a quickly retrievable form.

2) Fruitful solutions could be worked out if librarians and scientists join together to perform this job.

3) Indian publishing trade has also a very good potential in the publishing and marketing of documentation projects of reference value.

REFERENCES

[1] Banerjee, S R & Moitra, S: Agricultural documentation services in India: National Agricultural Research Information Centre. (Unpublished) Paper presented at the ICAR/PAU, Seminar on Agricultural Librarianship and documentation held at Ludhiana, 2-5 Feb 1977.

[2] Phadnis, S P & Shoib Ahsan Abu: Indian agricultural data and information. Annals of Library Science and Documentation 1976, 23(1), 87-97.

[3] Ramachandra, H R & Somasekhar, K T: Bibliographical organization of literature in agricultural sciences. AALDI Bulletin 1979, 7, 24-33.

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A STUDY ON THE LOSS IN TRANSIT OF JOURNALS SUBSCRIBED THROUGH A VENDOR

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Loss of journals in transit subscribed by a Government research-based library through a vendor is examined. The subscription procedure is described in detail and the lacuna are pointed out. Based on the data on percentage of loss calculated issue-wise and costwise, reasonable figures for writing off the loss are given. Controlling factors for checking the loss are listed and remedies suggested.

INTRODUCTION

Journals being the primary source of information occupy a pivotal position in the acquisition policy of any research-based library. Library budget in such institutions is always in favour of journals and in some cases the budget ratio for higher allocation for journals is ascribed to the high cost of journals as well as the importance given by scientists to the journals in their total reading programme. A survey of a mixed group of U.S. scientists and engineers, carried out by R.R. Shaw, indicates that 70% of all their reading was from journals[1].

OBJECTIVE

Journals in a library are normally acquired by subscription and sometimes by exchange. Experience shows that invariably some of the issues are missed/lost in transit. The complaints are more frequent in case of supply from abroad and about 80% of the journals acquired by a scientific and technical library in India are of foreign origin. In spite of the consistent follow-up action for replacement of the missing issues, there still remain some issues unsupplied which cause gaps in the journals file. The gaps not only cause inconvenience to the users but also create maintenance problem for the libraries. Even cost-wise, sometimes the loss is substantial as some of the issues may be very costly e.g. single issue of Chemical Abstracts costs about Rs.900/-. Granting that some loss of issues in transit is inevitable, it is necessary to arrive at some reasonable figures for writing off the loss.

PROCEDURE FOR SUBSCRIPTION THROUGH VENDORS

In order to study and explain the loss, it is essential to know the procedure adopted in the libraries especially those under the Government of India. Journals are subscribed through a vendor selected on the basis of favourable terms and conditions after floating the tenders/quotations. Subscription of journals directly from the publishers which has its own merits and demerits is beyond the scope of this paper and is, therefore, not discussed.

When the selection of the vendor is finalised, a contract/agreement is entered into between the vendor and the institution (henceafter to be referred to as subscriber) on behalf of the Government of India laying down the terms and conditions of the supply. The vendor may be asked to furnish a bank guarantee and income tax clearance certificate to establish his credence. On receipt of the subscription order, the vendor receives the subscription amount in advance and remits the same to the publisher. The journals are received by the subscriber directly from the publisher. The missing issues usually identified on the receipt of the next issue, are reported by the subscriber to the vendor on fortnightly/monthly basis. The vendor corresponds with the publishers and the replacement copies, if sent by the publishers, are received directly by the subscriber, whereas negative replies are received through the vendor. In case of non supply of complete set or cessation of a journal, subscription amount is refunded or adjusted by extending the subscription period.

The real problem arises in case of refund of the cost of the in-between missing issues which remain unsupplied in spite of the efforts made by the vendor with the publishers. For this, the terms of the contract/agreement have to be referred to for putting forward the claim for refund of proportionate cost of the unsupplied issues.

The Agreement adopted by Government of India Libraries has been prescribed by the Ministry of Finance. The clause dealing with refund of the cost of the unsupplied issues is reproduced below:-

> "In the event of any of the copies of the said newspapers or journals being lost in transit or in the event of the suppliers failing to supply any such copies after their publication for any reason whatsoever, the suppliers shall replace all such copies as may have been lost in transit or as the case may be, supply to the Government any copy which they have failed to supply to the Government without any extra charge on receipt of intimation on their behalf."

The Agreement is prescribed to safeguard Government interest as the subscription amount is to be given in advance to the vendor. No special agreement need, however, be entered into, if in the judgement of the administrative authorities, the formality of executing an agreement is not necessary.

The vendor agrees to pay the cost if complete volume is not supplied by the publisher or the journal has ceased publication etc. (and that too on publisher's refunding the said amount to him). In the case of the in-between issues, since the publisher does not refund the proportionate cost to vendor on the plea that the issues have been duly dispatched to the subscriber by the publishers, the vendor shows his inability to do the same to the subscriber. Under these circumstances it is difficult to press claim for refund of the cost of the missing issues invoking the referred to clause of the Agreement.

DEMAND OF AUDIT

As per agreement, literarlly speaking, the loss should be assessed and finalized just after the close of the subscription year but practically it is not possible. Normally it takes about 2 to 3 months for the foreign journals to reach the subscriber by surface mail. Besides, some of the journals may be behind schedule especially the translated journals. The final loss can be assessed only at the end of the successive year, when all possible action for replacement copies is expected to have taken place.

The peculiar thing about the loss due to missing issues is that the loss occurs before the journal is actually received by the subscriber. The possibility of occurrance of the loss may be due to one of the following reasons:-

i) Publisher has not dispatched.
ii) Lost in transit (by postal authorities).
iii) Lost at the receiving end, before recording its receipt.

For writing off the loss the audit authorities are required to be convinced that the loss in question did not occur due to theft, fraud or negligence. It is difficult to substantiate that the loss of the issues occurred in transit. It is this situation which is required to be appreciated by the audit authorities for taking broader and sympathetic view of the problem. Of course, they have to be provided with the norms on the resonable loss which is unavoidable under the normal conditions.

FORMULATION OF NORM

The norm can be established as percentage of loss costwise (cost of missing issues/total subscription cost) as well as issuewise (No. of missing issues/ total number of expected issues). On the basis of data collected by the present authors from a reputed scientific and technical library, the figures arrived at are as shown in Table 1.

Table 1

Year of subscrip-tion	No. of subscrib-ed journals, supply of which had started	Percentage of the missing issues	Percentage of the cost of the missing issues	Remarks
1970	602	2.4	3.8	
1971	642	6.9	5.5.	
1972	537	3.3	2.9	Vendor continued
1973	497	5.7	4.2	
1974	493	6.8	5.0	
1975	480	5.9	5.1	
1976	480	6.3	4.2	

The Unit cost of missing issues in the above case comes to about Rs.36/-. It may be seen that the percentage of the missing issues has no correlation with the percentage of the cost of the missing issues; the reason being that the missing issues do not necessarily cover all the titles uniformly. In the year where the loss is comparateively less e.g. 1972 – 2.9%, the vendor was in the third successive year of service and had probably geared up his machinery. From the above it is evident that 4% to 5% may be taken as the reasonable figure for loss of missing issues (cost-wise) and 5% to 6% issue-wise.

CONTROLLING FACTORS

The loss of missing issues can be minimized if it is possible to adopt the following measures:-

i) The vendor may be appointed for more than one year to provide continuity of action. This will enable the vendor to pursue with the publishers more effectively.

ii) The supply order may be placed well in advance at the beginning of the subscription year and payment remitted to the vendor with minimum delay. This will enable the vendor to call for vouchers from the publishers and remit subscription on time.

iii) The supply order (list of journals) may be prepared country-wise and provided with all necessary details such as title, frequency, publisher's address to save time otherwise spent in unnecessary correspondence by the vendor.

iv) Issuing of reminders for non-receipt of issues may be given top priority and may be procedured for speed in action as well as meeting the audit requirements.

v) Surprise checks may be made with the publisher to ensure that the vendor has remitted the subscription and written on time for replacement of missing issues.

vi) To check loss at the receiving end, Post Boxes may be hired from the postal authorities and necessary arrangement to collect post (journals) may be made by the library itself.

EPILOGUE

The conclusions drawn in the paper are on the basis of data from a single library as data from other libraries could not be available. More data should come forth from other institutions. The present figures serve to give an idea about the extent of loss in transit of journal issues.

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REFERENCES

1. Meadows A J: Communication in Science. London: Butterworths, 1974, 106.
2. Luthra K L: Problem of missing issue of periodicals. Herald of Library Science 1976, 15(2), 126-32.

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STUDY OF THE PROBLEMS OF READER DELINQUENCY IN COLLEGE LIBRARIES OF THE UNIVERSITY OF DELHI

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A sample of 17 college libraries of University of Delhi was used to critically examine various aspects of reader delinquency. A delinquent, in this context has been defined and various forms of delinquency are recognized. Survey research method was used for data collection. Data analysis show that .38% of the collection is lost annually and of the rest 24.05% is mutilated and 17.5% is misplaced. When reader delinquency occurs in a library, three parties are involved - the library, the delinquent reader and the other group of readers. Concludes with measures to check delinquency and a model which shows the extent of the loss.

1 INTRODUCTION

The loss of books in libraries has always been a problem but over the past few years losses have been rising. Today books vanish off the shelves and go out of the libraries in an unending flood to the extent that every patron or other visitors, too, can be viewed as potential thieves. When a book is lost the library suffers not only its cost but its processing cost too.

It may seem strange that although libraries suffer a lot from mysterious disappearance of books, it is a subject not widely discussed by librarians. A reason Badriprasad[1] has given for this is that "talking about these things might provide ways and means to the potential offenders". In other words, it may create more library thieves, therefore, this escapist attitude is adopted. In fact, there are three basic reasons[2] for such an attitude. Firstly, there is a natural hesitancy to attempt to discover the true extent of losses because when the truth becomes known something will have to be done about it. Secondly, some librarians feel that nothing can be done about it, as losses are an inescapable condition of open stacks and free access. And thirdly, the prevailing opinion seems to be that stock-taking is too expensive and the cost of such undertaking is far greater than the monetary loss from missing books.

Various studies have revealed that it is the academic and public libraries that suffer the most by this problem. A special library is used by specialised patrons only, who are considered more responsible. I have confined myself to this growing problem in college libraries alone. A question arises here as to why college libraries suffer the most. An answer to this question regarding student's attitude to libraries is best provided by Broadhead[3]; "The pressure of academic studies upon the students has intensified to the level where they feel that personal need overrides any obligation to adhere to library procedure, which results in unrecorded removal of library materials. This in turn enhances the demand factor, frustration sets in causing an increasing number of library users to adopt the same use. The chain reaction causes a spiral effect on book losses".

2 WHY THE TERM DELINQUENCY?

According to Webster's Third New International Dictonary a "delinquent individual" means "a transgressor against duty or law especially in a degree not constituting crime"[4]. Thus a user of the library who steals or damages documents in a library can be regarded as a transgressor against duty or law. Thus, he may be called a delinquent.

The use of the term delinquent was first made by Ralph Munn[5] in the year 1935, in a paper presented at Denver Conference where he blamed the educators for what he called juvenile delinquency[6] amongst college adolescents by their faulty teaching methods. Literature search reveals that during the last decade there has been frequent use of this term in library science literature.

For the purpose of this study the term delinquent reader has been taken to mean "a user of the library who over-borrows to a high degree, or retains books after they have been recalled, or illegally borrows or misplaces books, or steals or mutilates books"[7]. This excludes those persons who break library rules accidentally or through foregetfulness.

Based on the author's M. Phil dissertation of Delhi University.

Also excluded are harms done to physical property of the library.

In view of the above definition of a delinquent reader, we may recognize the following forms of delinquency -

> Overborrowing, overdues, illegal borrowing, misplacements, theft and mutilation.

21 *Overborrowing*

Overborrowing is getting more books issued than the number determined by the library.

22 *Overdues*

A book is said to be overdue when it is kept by a reader for period longer than that determined by the library.

23 *Illegal borrowing*

It is theft of library books by means of stolen or found library tickets or borrower's cards.

24 *Theft*

Theft is taking and removing the property of others without the consent of the rightful owner with the intention of converting it to the taker's use. A library theft is defined as carrying out of a library book without prior permission of the librarian.

25 *Mutilation*

Mutilation is caused when a book is made unfit for reading purposes wholly or partially by cutting off or destroying its pages in some other way. Mutilation is not as serious as theft as the book physically remains in the library with its limb or limbs gone.

26 *Misplacement*

It means placing books at points other than those determined by the library.

3 OBJECTIVES

The following were the objectives of the study:

- to study various forms of delinquency.
- to find out the annual percentage of loss in college libraries.
- to know the loss-to-use ratio.
- to know the annual loss in terms of amount (in rupees).
- to examine and analyze the factors that cause delinquency.
- to know the attitude of non-delinquents and the effects of their activities on delinquents.
- to study the delinquent's behaviour in relation to psychological, environmental and socio-economic background.
- to determine the methods of prevention of delinquency as suggested by staff, students and teachers.

4 METHODOLOGY

41 *Survey Research*

Survey research method was used to carry out this study as survey is versatile and practical especially for administrator as it indicates present conditions and points to present needs"[8]. Surveys cannot make decisions for researcher but provide information on which to base sound decisions. The techniques of data collection used were:

> Direct observation, Interview based on questionnaire and case studies.

411 *Direct observation*

This method was chosen as it not only helps to study individual behaviour but human relations too. Also, the data gathered are more reliable and unbiased. For the purpose of this study four college libraries were chosen as sample and in each of them the behaviour of library staff and students was observed. Most of the data were recorded on the spot.

412 *Interviews*

Interview is one of the principal survey methods which helps to draw information from people. Sturctured interview method was used and a set of questions already prepared was used to ask questions. For this study interviews of library staff members, teachers and students were taken. Most of data were collected through this method.

413 *Case Studies*

The case study consists of data relating to some phase in the life history or entire life process of the individual. Therefore, this method was adopted to study the behaviour of delinquents. Names and addresses of such students were taken from librarians or through other students. Data were collected regarding their background, type of delinquency they had indulged in, their reasons for doing so, and so forth.

42 *Sample*

A sample consists of limited number of items or people from whom generalizations can be made about the whole population. For the purpose of this study disproportionate stratified sample[9] was used. Stratifying a sample is performed by classifying or dividing all elements in the population into categories that are relevant to the study. In proportionate stratified sampling, proportional number of samples from each category are chosen at random but in disproportionate stratified sampling enough elements from each stratum are chosen so that in case of small categories the same is properly represented.

In University of Delhi there are 67 colleges having their own libraries. These were divided into different categories on the basis of location or region. In all a sample of 17 college libraries from all regions was chosen. Thus the sample consists of 12 college libraries from campus and neighbouring areas, 2 from West Zone, 2 from South Zone and only one from East Zone (this zone has only 2 colleges). A sample of 54 delinquents and 64 non-delinquents was used for the study. About 58 teachers from colleges of University of Delhi were also interviewed to get their views and suggestions.

5 ANALYSIS AND FINDINGS

Analysis is concerned with satisfying man's deep desire to uncover that lies beneath the surface. It reduces a field to 'size' and helps in splitting the whole data in small categories on the basis of logical categories. The data gathered should be analyzed to the limit that is possible, consistent with the aim of the survey but the analysis should never be overelaborated. In case of data gathered by observation, much analysis is done on the level of logic. A researcher has to draw conclusions on the basis of what has been seen or heard without any bias. Regarding data collected from interviews, the answers are to be reduced to meaningful form to draw conclusions. Some of the data can be presented in the form of tables, diagrams or figures.

51 *Forms of Delinquency*

511 *Annual loss in college libraries*

As already mentioned, a sample of 17 college libraries was used to study loss rate. Of these 17, data available from 15 college libraries were used for drawing conclusions as in 2 college libraries stock taking is not done at regular intervals.

Table 1 shows annual loss for the year 1977-78 in college libraries. The number of books lost varies from 21 to 360, i.e., from .21% to .84%. Thus, on an average, .38% of books are lost annually. In case of the library where loss rate is .21% the figures are low due to the fact that it is an evening college and its students take "studies seriously". Also all the books used frequently have been placed under closed access which minimises losses. In the college library where loss is .84%, the highest, the figures are high due to the reason that the library is located in an isolated place. The case studies of students from this library reveal that they don't take studies seriously and when the examinations approach they depend on stolen books or torn pages from books of their library. Open access too increases greatly the loss of books.

5111 *Loss-to-use ratio*

Materials issued out of the library are more liable to be lost than those used within the library. The circulation figures have direct relationships with loss and mutilation. The loss to use ratio can be calculated on the basis of taking ratio of books lost to the books issued out of the library.

Books lost: Circulation figures of the period.

Table 1 indicates that on an average, one book was lost for every 496 books circulated during 1977-78. The loss rate varies from one book lost for 228 books circulated to one book lost for 1572 books circulated.

512 *Mutilation*

A sample study on mutilations was done in 17 college libraries to know the extent of damage caused. To get a proper picture sample included campus, non-campus, girls, co-educational, special and evening college libraries.

In each college library, books at random from every fifth row and from each row, every third shelf were checked for various forms of mutilations. In each library five such shelves were chosen as sample. The data collected thus has been presented in Table 2. A book was considered to be mutilated if it had pages missing, underlining with pen or pencil, marginal notes, ink marks or any other marks or folds.

As seen from Table 2, on an average out of 142 books nearly 34 have been mutilated in one form or another. This means that nearly 24.05% of the collection is mutilated, which shows a high degree of mutilation in college libraries of University of Delhi.

513 *Misplacement*

Although not considered a very serious offence and offenders often let off, misplacements often cause problems and may lead to duplication. The librarians of libraries visited had no records of students caught misplacing books. Therefore, a sample study on misplacements was carried out in 17 college libraries.

In each college library, books at random from every fourth row and from every row every third shelf were checked for any misplaced books. A book was considered to be misplaced in 3 ways– a book placed in another subject, a book placed more than one shelf away and a book placed away on some shelf or one shelf before or one shelf later. In each library, fifteen such shelves were checked.

As seen from Table 3, in college libraries of University of Delhi, 17.6% of the collection is misplaced. On an average out of 426 books, 75 books were found to be misplaced.

514 *Illegal borrowing*

Illegal borrowing is by means of stolen or found library membership tickets. The librarians do not seem concerned about this form of delinquency as they always recover the cost of

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the book from the student whose ticket is involved. This study revealed that during each academic year, 5-6 such cases occur in each college library. These incidents usually take place during or before examination time.

515 *Overdues and overborrowing*

To get data of overdues, five college libraries were chosen as sample. From each college library figures (only estimated) regarding return of books, overdues and overborrowing each day were taken. In each college library about 400-450 books are returned everyday of which about 100-125 are overdues. This means that about 25% of returned books are overdues.

Overborrowing is only during examinations and that too occurs only with the help of library staff members.

52 *Annual loss in amount*

Loss in terms of amount of rupees was calculated by taking average price of a book. For this purpose, 50 books (most of them were textbooks and published in India) acquired by a college library, during the period for which loss figures were taken, were considered as sample. From these 50 books, average price of one book was calculated, which comes to about Rs.22.50 per book. To this was added the processing cost, i.e., 10% of the cost of the book. Thus, cost of one book lost is Rs.25/-.

Table 1: Annual loss and loss-to-use ratio in college libraries of University of Delhi

College	Total stock	Total books lost	%	Circulation figures	Loss-to-use ratio	Amount lost (in Rs.)
A	65,000	224	.35	50,000	1:224	5,600
B	50,000	204	.41	1,32,500	1:650	5,100
C	60,000	200	.33	1,08,000	1:540	5,000
D	56,000	250	.45	1,80,000	1:720	6,250
E	50,000	210	.42	1,08,000	1:514	5,250
F	60,000	150	.25	1,08,000	1:720	3,750
G	53,600	112	.21	1,37,409	1:1226	2,800
H	61,000	275	.45	1,25,000	1:499	6,875
I	45,000	225	.50	81,000	1:360	5,625
J	43,000	360	.84	1,24,282	1:349	9,000
K	65,000	200	.31	1,08,000	1:540	5,000
L	17,500	50	.29	36,000	1:720	1,250
M	10,000	21	.21	28,800	1:1372	525
N*	--	--	--	--	--	--
O	50,000	185	.37	91,600	1:483	4,625
P*	--	--	--	--	--	--
Q	60,000	222	.37	1,10,000	1:496	5,550
Total	7,46,100	2,888	--	14,28,591	--	72,200
Average	49,740	192	.38	95,240	1:496	4,800

* *Indicates college libraries where stocktaking is not done at regular intervals.*

As seen in Table 1, on an average each college library loses about 192 books every year and the cost of these lost books is about Rs.4,800/-. This loss is written off each year by the authorities.

53 *Factors that cause delinquency*

When delinquency takes place in a college library, the three parties involved are: the library, the delinquent reader and the other mass of readers (the non-delinquents).

531 *The library*

Regarding library there is a saying "Good service, less theft, Less theft, good service"[10], on the basis that if service is good, students feel more or less satisfied and there will be less cause for delinquency. If there is less theft, then it will mean that the library provides good service. But the library should be prepared for some losses as for good service there are bound to be some losses. The library's role may be considered as follows:

- Lack of proper security arrangements
- Non-availability of reading materials
- Attitude of library staff to users
- Loan period not long enough
- Faculty reservation system
- Heavy fines
- Lack of photocopying facilities
- Open access vs closed access

532 *Role of other mass of readers*

Delinquent behaviour can be due to two main reasons -- firstly, any sort of delinquency gives room to delinquent behaviour on the part of other students and secondly, it can be due to actions of non-delinquents too. A question arises as to how innocent borrowers give room to delinquency. For this, there are two reasons-- firstly, some innocent borrower can give rise to circumstances which may give room to others for indulging in delinquent behaviour. And, secondly, failure by students to condemn delinquent behaviour may give room to theft, mutilations or misplacements. Students often fail to bring to the notice of the librarian any act of delinquency they know of, as often such acts escape the notice of library staff but not of other students. The students became indignant only when they themselves are affected in some way. This is found even in the state of our society. A peaceful citizen does not have the moral courage and does not want to get himself involved in any dispute. He feels insecure in case he decides to take some sort of action against criminals.

533 *The delinquent reader*

As already mentioned, delinquency is encouraged by failure on the part of library to ensure good service or by other readers who unintentionally encourage reader delinquency by some innocent action. But a significant amount of delinquent behaviour does not fit into this pattern. Most of the librarians interviewed were of the view that delinquent borrowers were basically selfish persons. It has been found that a student while indulging in delinquency thinks that "my need is greater than others so I must have it now". Such a student does not hesitate to remove a book fully or partially by hook or by crook. A delinquent's mentality can be explained if we presume him as a person who is selfish and thinks only about himself. He does not consider the library as his own and has no sense of belonging.

Regarding behaviour of delinquents Vyas[11] gives three reasons -- psychological, socio-economic and environmental.

Psychological: Regarding psychology of students Savage[12] writes, "students would hand to the police any purse they found, yet they don't hesitate to smuggle out books belonging to the library". From this it is evident that students don't have much of honesty in their dealings with the library. Here, frustration too plays an important role. A student not well prepared for examination gets frustrated and loses voluntary control over his motivation. He does not usually intend to harm others but in some cases he does not hesitate to harm others as his only intention is to be benefitted.

A student's behaviour when he is alone is quite different from when he is with a group. In our libraries many thefts take place when students visit libraries in a group. In a group, a student becomes more bold and even willingly takes advice from his friends regarding methods and techniques for delinquent behaviour. Also he knows that he is quite protected in a group.

Socio-economic aspect: Here we study the culture of a person's society on his thinking and his action. There are strong forces in our society which encourage students to proceed in certain directions and discourage them from going in other directions. Thus, when a student steals a book he does it under the influence of certain social factors. Here economic conditions too play an important role. In poor economic conditions a student cannot afford to buy too many books and with the influence of these social factors he resorts to stealing books or tears away pages from books.

In the present society nobody wants to report crime and failure on the part of people to do so gives more room to crime. In our context too this is applicable.

Environmental aspect: This deals with the external circumstances, conditions and things that affect the existence and development of an individual. Here relation between the offender and the environment where he lives plays an important role. The environment influences the individual and he indulges in delinquent behaviour. When a person's behavioural freedom is threatened or eliminated he might experience hostile or aggressive feelings towards responsive agents. Therefore, in a library when a student is denied reading materials in some way or other he becomes aggressive. Lost and damaged books are evidence of such behaviour.

6 MEASURES

From the previous sections it is clear that delinquency is a serious problem. In view of this, certain measures are to be adopted by libraries to check delinquency. Given below are some measures, some of which are already being done and some still needs to be done.

61 *Circulation of Books*

(1) Reduction in loan period if a book is in much demand. Some norms need to be established based on demand and nature of a book.

(2) Get back books from teachers (do not issue more than one copy of a book) after each semester.

(3) Library staff while issuing out library books should try to see identification of the borrowers. This will avoid illegal borrowing. As it is not possible to check all the borrowers, random checks can be made.

(4) Reservation of books.

62 *Security*

(5) Role of the person at the checking point is extremely important. He should be honest, alert and a little strict. Usually older employees are good in this respect.

(6) The staff on duty in stacks should keep moving in the stacks most of the time.

(7) Greater vigilance during lunch hour and just before the close of the library.

63 *Maintenance*

(8) Shelf rectifications on regular basis to discover displaced books. At present regular shelving is not done. (Make note of a book found in a particular place, do not remove the book and catch the person at the time of issue).

(9) There should be multiple copies of books. The only copy of a book in great demand should be retained in the library as far as possible.

(10) Loose binding makes mutilations (especially tearing of pages) easier. Therefore, priority should be given to binding.

(11) Checking of books by library staff at the time of their return.

64 *Building design*

(12) If building design permits, access to certain sections of the library should be closed when limited staff is available.

(13) Avoid study carrels and partitions as far as possible as they help mutilators.

65 *Library staff*

(14) Attitude of library staff to users is very important. They should use the humane approach.

15) Availability of assistance in location of books and use of catalogue for students at all times.

66 *Others*

(16) Photocopying facilities.

(17) Electronic security measures (if a college library can afford it).

(18) Undergraduate library

Regarding multiple copies, the librarians can take help from the undergraduate library in their zone. Since 1974, University of Delhi has started undergraduate or zonal libraries to cater to the needs of undergraduates and to make books readily available for them.

Their chief aim is restricted to lending of textbooks. They supplement college library services to the increasing number of undergraduates. There should be liaison between college librarian and undergraduate librarian of the zone so that unnecessary wastage of purchase of materials can be avoided. These libraries are open during evenings too. This also helps students as these libraries are located in residential areas.

7 CONCLUSION

In the past, books were few and so were the borrowers. But presently book losses are on the increase as this study and many others have revealed. It is very important to check losses occurring in this manner.

This study reveals that on an average .38% of the books are lost annually from college libraries of University of Delhi. For every 496 books circulated one book is lost. Of the remaining collection, 24.05% was found to be mutilated and 17.5% misplaced.

On the basis of the above findings, a model is drawn below:

Model: Let us assume that a library has 50,000 volumes in its stock.

According to this study:

a) Books lost annually are .38% of the whole collection.

Therefore, total books lost = 190

Cost of books lost = Rs.4,750/- (cost calculated at the rate of Rs.25/- per book including processing cost as referred in section 52).

b) Of the remaining collection, books mutilated = 24.05%

Total books mutilated = 12,025

c) Books misplaced = 17.5%

Total books misplaced = 8,750

From the above model, it appears that about 21,000 books out of a collection of 50,000 are affected by delinquency. From this it can be concluded that 42% of the collection is hit by delinquency.

Several measures (section 6) have been suggested by librarians, students and teachers. Many methods have already been applied but we have been unable to solve this growing problem. The reason for this is that theoretical methods are hard to apply and in each situation a different method is re-

Table 2: Mutilations in college libraries of University of Delhi

College	Number of books checked	Number of books Mutilated
A	120	39
B	142	35
C	149	50
D	152	42
E	152	27
F	143	38
G	137	25
H	142	41
I	142	43
J	136	28
K	141	32
L	143	34
M	134	15
N	142	31
O	152	25
P	142	33
Q	151	41
Total:	2,420	582 (24.05%)

Table 3: Misplacements in college libraries of University of Delhi

College	Number of books checked	Number of books misplaced
A	420	80
B	457	93
C	456	85
D	458	118
E	450	91
F	453	94
G	444	100
H	325	26
I	468	76
J	425	84
K	438	80
L	429	57
M	330	41
N	410	52
O	398	64
P	426	42
Q	460	96
Total:	7,247	1,279 (17.6%)

quired. However, there is a certain common threat that runs through these situations. Here, user education is an important aspect. It is for the college authorities especially the Principal, the parent body and teachers, besides the librarian, to wean away students from this criminal tendency. The authorities too should be prepared for some losses, as for good service some losses are likely to occur. Their change of attitudes is essential. Presently there is a lack of proper environment and the state of the society is reflected in the state of libraries too. Therefore, unless teachers and college authorities work with librarians it is hard to overcome this problem. The aim should be to avoid wastage of resources and building up of collection so that students get minimum chance to indulge in delinquent behaviour. Thus the college library authorities are to be educated to accept some losses if services are to be provided. Here, library associations can play an important role. The association should have conferences, discussions or seminars where principals, teachers and library authorities may be invited to discuss this problem to reach some conclusion.

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9 REFERENCES

1. Badriprasad: Problems of misplacements, mutilation and theft of books in libraries. Delhi: Goswami, 1968, P.14.
2. Roberts M: Guards, turnstiles, electronic devices and the illusion of security. Coll & Res Libs 1976, 29(4), 236.
3. Broadhead R M: Thefts: New Libr World 1976, 77, 236.
4. Webster's Third New international dictonary. London: Bell, 1961. VI. P.536.
5. Munn R: Problems of theft and mutilation. Lib J 1935, 60, 592.
6. Ibid.
7. Souter G H: Delinquent readers: a study of the problems in University Libraries. J. Librarianship 1976, 8(2), 97.
8. Mouly G: Science of educational research. New Delhi: Eurasia Publishing House, 1964. P.233.
9. Carpenter R L, Vasu E S: Statistical methods for libraries. Chicago: ALA, 1978, P.29.
10. Savage E A: Buy, Borrow or steal. Lib World 1957, 59, 47.
11. Vyas S D, Pawar B S: Loss of books in libraries. Herald Lib Sci 1975, 14, 240-41.
12. Savage E A: Buy, borrow, or steal: Thieves methods. Lib World 1958, 60, 3.

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RANKING OF PERIODICALS IN THE FIELD OF SOIL CONSERVATION

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Citation study of Vols.1-8 (1973-80) of the Indian Journal of Soil Conservation (formerly Soil Conservation Digest) has been made to find out the important Indian and foreign journals in the field of Soil Conservation.

1. INTRODUCTION

Citation studies have yielded useful data on the relative use of various types of documents, preference of journals, language and country preference, time-lag and half-life of documents in different subject fields[1-3]. Such studies are also able to bring out clearly the related areas of a particular field of study. Citation study in a very specific and developing field, such as, soil conservation is likely to yield interesting and useful results.

2. OBJECTIVE AND USEFULNESS OF THE STUDY

The identification of most important periodicals containing research literature on Soil Conservation is the major objective of this study. For this study Indian Journal of Soil Conservation was taken as a source journal. Moreover, it provides a quantitative analysis of various categories of soil conservation literature as recorded in the Indian Journal of Soil Conservation from Vol. 1-8 (1973-1980); and embodies a ranked list of journals.

The ranked list provided here, is expected to be of some help to librarians in the selection of most useful periodicals in the field.

3. METHODOLOGY

All the citations mentioned at the end of the research articles of the Indian Journal of Soil Conservation (formerly Soil Conservation Digest), Volumes 1-8 (1973-1980) were noted down on cards. In all, there were 922 citations, out of which 491 citations pertained to journal articles. The cards containing the information on journal citations were further divided into two categories i.e. Indian periodicals and foreign periodicals. The number of times each periodical was cited, was found out. The results were tabulated (Tables 1 & 2) to show the cited journals in both the categories. Thus the ranked lists of periodicals were prepared in the descending order of the frequency of citations.

4. OBSERVATIONS

From Tables 1 and 2 a comparison can be made regarding the citation habits of scientists. Out of 922 citations, the total number of journal citations were 491 i.e. 53.25%. These citations were divided into two broad groups and it was found that out of 491 citations 322 were from Indian and 169 were from foreign periodicals. This means, out of 53.25% of journal citations, 34.92% were from Indian and remaining 18.3% from foreign periodicals.

The high percentage of journal citations reveals not only the importance of the periodicals but also the extent to which the scientists depend upon them.

4.1 *Indian coverage*

In the study it is found that Indian journal citations account for 34.92% and these are distributed among 32 periodicals (Table-1). The Journal of Soil and Water Conservation in India tops the list. Out of these 32 journals the first 6 journals in the ranked list account for 74.5% citations indicating that these journals are important to the field of Soil Conservation.

4.2 *Foreign coverage*

When Table 2 is taken into consideration it is found that 169 citations were foreign journal citations and accounted for 18.33% of the total citations. 169 citations (18.33%) were related to 35 foreign periodicals. In the ranked list of foreign

Table 1

Ranked list of Indian periodicals

Sl. No.	Title of the periodical	No. of citation	% out of 322	Total % out of 491	Overall coverage out of 922
1.	Journal of Soil & Water Conservation in India	68	21.1	13.8	7.4
2.	Journal of Indian Society of Soil Science	55	17.1	11.2	6.0
3.	Indian Forester	51	15.8	10.4	5.5
4.	Indian Journal of Agronomy	28	8 7	5.7	3.0
5.	Indian Farming	19	5.9	3.9	2.1
6.	Annals of Arid Zone	19	5.9	3.9	2.1
7.	Indian Journal of Agricultural Sciences	17	5.3	3.5	1.8
8.	Indian Journal of Soil Conservation	15	4.7	3.1	1.6
9.	Journal of Indian Society of Agricultural Engineering	06	1.9	1.2	0.7
10.	Journal of Agricultural Engineering	05	1.6	1.0	0.5
11.	Madras Agricultural Journal	0.4	1.2	0.8	0.4
12.	Harvester	04	1.2	0.8	0.4
13.	Journal of Irrigation & Power	03	1.0	0.6	0.3
14.	Journal of Meteorology and Geophysics	03	1.0	0.6	0.3
15.	Bulletin of National Institute of Sciences of India	03	1.0	0.6	0.3
16.	Indian Journal of Horticulture	02	0.6	0.4	0.2
17.	Journal of Inland Fisheries Society	02	0.6	0.4	0.2
18.	Mysore Journal of Agricultural Sciences	02	0.6	0.4	0.2
19.	Indian Journal of Agricultural Economics	02	0.6	0.4	0.2
20.	Science & Culture	02	0.6	0.4	0.2
21.	Farmer's Journal	01	0.3	0.2	0.1
22.	Kheti	01	0.3	0.2	0.1
23.	Indian Journal of Rural Science	01	0.3	0.2	0.1
24.	Indian Journal of Adult Education	01	0.3	0.2	0.1
25.	Geology	01	0.3	0.2	0.1
26.	Indian Journal of Agricultural Research	01	0.3	0.2	0.1
27.	Himachal Horticulture	01	0.3	0.2	0.1
28.	Indian Journal of Extension Education.	01	0.3	0.2	0.1
29.	Intensive Agriculture	01	0.3	0.2	0.1
30.	Indian Agriculture	01	0.3	0.2	0.1
31.	Allahabad Farmer	01	0.3	0.2	0.1
32.	Indian Journal of Geography	01	0.3	0.2	0.1
Total:		322	100	65.5	34.6

periodicals Soil Science Society of America Journal tops the list. The first six (6) in the ranked list account for 70.8% of the foreign journal citations (Fig.2). The situation is more or less similar to Indian periodicals.

Table II

Ranked list of foreign periodicals

Sl. No.	Title of the periodical	No. of citation	% out of 169	Total % out of 491	Overall coverage out of 922
1.	Soil Science Society of America Journal.	59	34.9	12.0	6.4
2.	Agronomy Journal	25	14.8	5.1	2.7
3.	Soil Science	18	10.6	3.7	1.9
4.	Transaction of American Geophysical Union	06	3.5	1.2	0.6
5.	Agricultural Engineering	06	3.5	1.2	0.6
6.	Transaction of A.S.A.E.	06	3.5	1.2	0.6
7.	Journal of British Grassland Society	05	2.9	1.0	0.5
8.	Water Resources Research	04	2.3	0.8	0.4
9.	Soils & Fertilizers	03	1.8	0.6	0.3
10.	Journal of Geophysics Research	03	1.8	0.6	0.3
11.	Journal of Irrigation & Drainage Division	02	1.2	0.4	0.2
12.	Agronomy Abstract	02	1.2	0.4	0.2
13.	Canadian Journal of Soil Science	02	1.2	0.4	0.2

14.	Journal of Soil & Water Conservation	02	1.2	0.4	0.2
15.	Weed Science	02	1.2	0.4	0.2
16.	American Potato Journal	02	1.2	0.4	0.2
17.	Geoderma	02	1.2	0.4	0.2
18.	Journal of Agricultural Research	02	1.2	0.4	0.2
19.	Vegetatio	02	1.2	0.4	0.2
20.	Journal of Environment Quality	01	0.6	0.2	0.1
21.	Transaction of American Fish Society	01	0.6	0.2	0.1
22.	Journal of Biological Chemistry	01	0.6	0.2	0.1
23.	Canadian Agricultural Engineering	01	0.6	0.2	0.1
24.	Ecologist	01	0.6	0.2	0.1
25.	American Journal of Botany	01	0.6	0.2	0.1
26.	Journal of Science	01	0.6	0.2	0.1
27.	Journal of Hydrology	01	0.6	0.2	0.1
28.	Chemical Engineering	01	0.6	0.2	0.1
29.	Journal of Agricultural Science	01	0.6	0.2	0.1
30.	Journal of Taiwan Agricultural Research	01	0.6	0.2	0.1
31.	Analytical Chemistry	01	0.6	0.2	0.1
32.	Canadian Journal of Research	01	0.6	0.2	0.1
33.	Journal of Agricultural Food Chemistry	01	0.6	0.2	0.1
34.	Texas Agricultural Progress	01	0.6	0.2	0.1
35.	Wool Technology & Sheep Breeding	01	0.6	0.2	0.1
	Total	169	100	34.2	17.7

4.3 *Non-journal citations*

When citations were analysed further, it was found that out of 922 citations, 431 were non-journal citations. Out of 431, 54 were symposium/seminar proceedings and 377 were books, bulletins, monographs, reports, etc. (Fig.1.). It is noticed that scientists in the field of soil conservation almost equally depend on non-journal literature. On further analysis it is also seen that among the non-journal literature symposium/seminar papers are cited more frequently than any other type of non-journal publication.

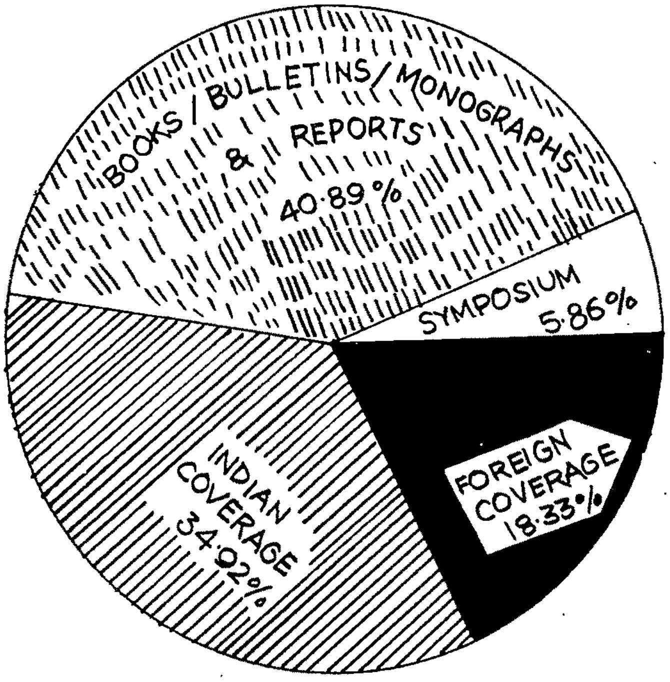

Fig.1

It is obvious from the study that the citations appeared in the Indian Journal of Soil Conservation related more to Indian periodicals than foreign. This suggests that scientists engaged in the soil conservation field have a tendency to refer and cite more Indian works.

The above figures disclose the pattern of concentration and dispersion of literature in the field of soil conservation. These ranked lists may be taken into consideration as tools in selecting more relevant periodicals in the field of soil conservation.

5. REFERENCES

1. Bhat, V G, Elisharaju, R: Ranking of periodicals in the field of astronautics and aeronautics. Annals of Library Science & Documentation 1977, 24, 114-18.

2. Singh, Mohinder: Studies of chemical literature and changes in the ranking of periodicals by citation analysis of data for 1967-76. Annals of Library Science & Documentation 1978, 25, 55-61.

3. Kundu, A K: Citations of the source journals in the field of library science and their ranking. Annals of Library Science & Documentation 1980, 27, 130-34.

Annals of Library Science and Documentation
1982, 29(1), 29-35.

INFORMATION PROFESSIONAL IN THE MAKING: A REVIEW OF A U.S. SURVEY*

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Describing the salient features of the emerging post-industrial society in US, moving towards an information economy, Daniel Bell says that the 'axial principle' of this new social order is the centrality and codification of theoretical knowledge as the source of innovation and policy formation[1]. Economically this new social order is reflected by a change from goods-producing to a service economy, (services include trade, finance, transport, health, recreation, research, education and government) by the pre-eminence of scientific, managerial, professional and technocratic class. The evidence to this theory could be seen in the noted economist Fritz Machlup's landmark study 'The production and distribution of knowledge in the United States' published in 1962[2]. In this study Machlup points out that the US work force engaged in information activities constituted around 45% of the total national work force. This observation was later (1976) corroborated in an extensive study by Marc Uri Porat[3]. This figure included a wide variety of persons who were directly involved in the handling of data and information as well as those that were engaged in work that centred on information. Table 1 gives the distribution of information personnel and the three broad categories of activities.

"The first category (A) includes those workers whose output or primary activity is producing and selling knowledge. Included here are scientists, inventors, teachers, librarians, journalists and authors. The second (B) major class of workers covers those who gather and disseminate information. These workers move information within firms and within markets; they search, coordinate, plan and process market information. Included here are managers, secretaries, clerks, lawyers, brokers and typists. The last class (C) includes workers who operate the information machines and technologies that support the previous two activities. Included here are computer operators, telephone installers and television repairers"[4].

While these studies lent substantial support to the notion of service-oriented information economy of the post-industrial society, the conclusion that nearly half of the US work force is engaged in information activities, has been too gross to be accepted on the face of it. This certainly called

Table 1

Types of information activities and distribution of personnel workers

- A Markets for information
  - A1 Knowledge producers
    - A11 Scientific and technical workers
    - A12 Private information services
  - A2 Knowledge distributors
    - A21 Educators
    - A22 Public information disseminators
    - A23 Communication workers
- B Information in markets
  - B1 Market search and coordination specialists
    - B11 Information gatherers
    - B12 Search and coordination specialists
    - B13 Planning and control workers
  - B2 Information processors
    - Non-electronic based
    - Electronic based
- C Information infrastructure
  - C1 Information machine workers
    - C11 Non-electronic machine operators
    - C12 Electronic machine operators
    - C13 Telecommunication workers

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* *Debons, A. et al: The informational professional; Survey of an emerging field. New York, Marcel Dekker, Inc. 1981. 271p.*

for a deeper analysis and disaggregation for the following reasons:

1) Manpower planning for a continuous supply of personnel in terms of type, quality and quantity; 2) Course design and curricula development for education and training to create the manpower required; 3) Appropriate placement of qualified persons in institutions dealing directly with information as well as those centred on information; 4) Creation of new institutions for new and expanding demands for information products and services; and 5) Research and development in information studies, both basic and applied. Additionally the fact that no comprehensive research study has ever been made on information manpower from all its angles reinforces the need for a deeper analysis.

Appropriately at this point, the School of Library and Information Science, which has been on the front line along with a few other educational institutions in US in organising and offering educational programmes responding to the new demands for information services, took the initiative to look into the manpower problem in a wholesome manner. In 1976 the University of Pittsburg convened a national Conference which drew experts from industry, government, the academic community and relevant professional associations to bring about a national survey of information professionals. On the recommendations of this Conference, a National Manpower Consortium for the information profession was constituted, comprising representatives from the different professional associations and organisations. The primary task of the Consortium was to advise and oversee 1) the design and implementation of a research programme for manpower survey; 2) the submission of proposals for funding, and 3) any additional support required for follow-up action. The University of Pittsburg was entrusted with the actual responsibility of conducting the survey and to take up three separate projects:

1. Identify and estimate information professionals in US;
2. Gather profiles (personal data, education, training, career pattern, attitude to work,etc.) from samples drawn from the first project; and
3. Analyze the data collected and identify gaps in professional education and training and make suggestion to fill them up and also examine changes in occupational classification for information work.

The first project funded by the National Science Foundations, was commenced in 1978. The University of Pittsburg was assisted by King Research Inc. with a special responsibility for sample design, questionnaire design, conduct of the survey and data preparation. Donald W. King played a key role in deciding on the conceptual work for the study, analyzing the survey data and writing the report. The principal investigator was Prof. Anthony Debons of the Pittsburg University's School of Library and Information Science.

This paper highlights some of the significant findings of the survey and their implications on manpower policy and planning and other related problems, as perceived by Glynn Harmon, one of the members of the National Manpower Consortium.

Objectives of the Survey

The main objective of the survey was to identify and estimate the number of information professionals working in the United States. The study set out to determine:

1. Who are information professionals?
2. What do information professionals perform?
3. Who employs information professionals?
4. Where in their organization are information professionals located?
5. Why are information professionals performing their work?
6. How are information professionals classified in terms of job titles and education?

'Information'; "Information Functions"; 'Information Professional' - Working Definitions

'Information' is defined for the purpose of this survey in relation to an information system.

"Source-based definition: Information is a symbol or string of symbols which have potential for meaning (the commodity of information).

Receiver-based definition: Information is that which adds or changes (my) picture of the universe (the process of information)"[5].

Figure 1 in the next page shows these two concepts of information in the context of an information system.

Information functions

Applying the above definition for 'information' and analyzing the existing job functions under the U.S. federal government employment series, the following nine primary information functions were identified:

1. Managing information operations, programmes, services or data base
2. Preparing data and information for use by others
3. Analyzing data and information on behalf of others
4. Searching for data and information on behalf of others
5. Remaining operational information functions

6. Information systems analysis
7. Information system design
8. Information research and development
9. Educating and training information workers.
(The detailed functions under each of the above are given in the appendix to this paper).

Information professionals

On the basis of the criteria set out, six generic groups of information professionals were formed and the intent was to allocate each major information function, or group of functions, to one of these six categories of professionals. The six groups were representative of *functions* the information professionals performed, regardless of their qualifications or their job titles.

1. Managers of information
2. Information operation coordinators
3. Information system specialists
4. Information intermediaries
5. Information theorists
6. Educators and trainees of information workers

Figure 2 shows the information professionals, their overlapping characteristics and the organisation sectors in which they are employed.

Survey methodology

The survey was carried out in five stages, viz.:

1. Preparation of a classification of functions performed by information professionals and giving sample job titles of persons performing these functions.
2. Conducting a pre-test and pilot survey to test the information function descriptions, and develop an operational method for conducting the main survey.
3. Collection and processing of data on information professionals performing the functions in organisations in four U.S. employment sectors.
4. Organisation and analysis of the data on information professionals.
5. Preparation and submission of a report on the findings of the survey.

Questionnaires were mailed to organisations where information professionals were likely to be employed, performing more or less the nine different groups of functions isolated for the study. The organisations were classified in four different economic sectors: 1) Industry; 2) State and local governments; 3) Federal government; and 4) Universities and colleges. The survey was oriented towards organisations that employed information professionals and not individual information professionals. Hence the questionnaires were expected to be filled in by general managers, personnel managers and officers, institutional reporting specialists, unit supervisors and others. Out of 2,358 questionnaires sent, 1,193 were returned, the response being nearly 50 per cent.

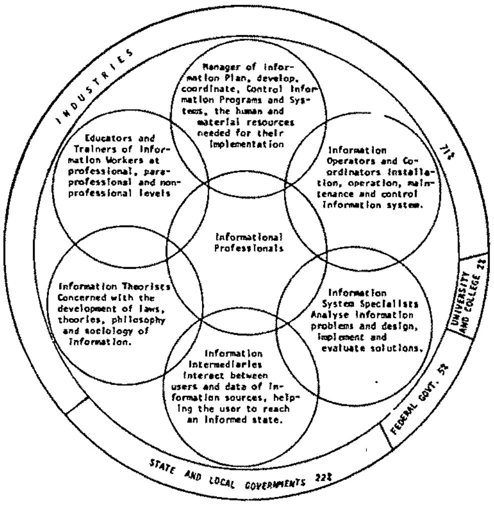
The questionnaire was carefully designed to elicit data on the following:

1. Functions - What do the information professional actually perform on the job?

Fig.1: In Information System[5]

ENVIRONMENT	DATA PROCESSING	INTERMEDIARY	PRIMARY USER
ENVIRONMENT	DATA PROCESSING	INTERMEDIARY	PRIMARY USER
Raw data relevant to user population selected, captured, and transmitted for processing and/ or storage	Data processed in light of user need and either displayed or stored for future use	Stored data retrieved, transformed if necessary to meet user need and disseminated	Disseminated data interpreted and assimilated by user, whose cognitive state is altered so that she/he "is informed" or "has information"
Raw Data (Symbols)	Information as a commodity (Symbols or strings of symbols which have potential for meaning)		Process of informing (Resulting in an altered cognitive state)

Fig.2: *Groups of Information professionals and their distribution in the sectors of occupation.*


INDUSTRIES
71%
Manager of information Plan, develop, coordinate, Control Information Programs and Systems, the human and material resources needed for their implementation
Educators and Trainers of Information Workers at professional, para-professional and non-professional levels
Information Operators and Co-ordinators installation, operation, maintenance and control information system.
Informational Professionals
Information Theorists Concerned with the development of laws, theories, philosophy and sociology of information.
Information System Specialists Analyse information problems and design, implement and evaluate solutions.
Information Intermediaries interact between users and data of information sources, helping the user to reach an informed state.
UNIVERSITY AND COLLEGE 2%
FEDERAL GOVT. 5%
STATE AND LOCAL GOVERNMENTS 22%

2. Sector - Who employes the information professional?
3. Subunit - Where is the information professional located in the organisation?
4. Workfield - Why (for what general purpose) are the functions performed by the informational professional carried out?

Main Findings of the Survey

In 1980, there were 1.64 million information professionals working in the four sectors in US.

1) *Functions*

The principal functions performed by the persons were:

1.	System analysis and design	20%	54%
2.	Management of information operations, programs, services or data bases	17%	
3.	Other operational functions	17%	
4.	Other functions	46%	
	Total	100%	

These functions accounted for about half of the total number of information professionals.

Some interesting data on the functions performed at the different sectors were:

i) Contrary to expectation, education and training functions were also performed in industry. In fact the ratio between persons employed for this purpose in industries and universities and colleges was 6:1. (The distinction between education and training was not made in the survey questionnaire).

ii) Research and Development activities that included theoretical studies on foundations, laws and theories of information system, etc. were primarily performed in industry. As compared to this, "the estimate of 200 information professionals engaged in information research and development in colleges and universities was almost certainly too low."

2) *Sector of employment*

The distribution of information professionals among the four sectors was as follows:

Industry and business	71%
State and local governments	22%
Federal government	5%
Colleges and universities	2%
	100%

i) About half of the information professionals in industry worked in computer and system analysis/programming units, a finding which points to a strong computer and system orientation in industry. The other half were somewhat evenly dispersed among the major functions and organisational units of management support research, information services (non-library), library services and finance. A sizeable number of information professionals was not identified with any particular organisational units, indicating that information professionals and functions in industry may be difficult to classify categorically.

ii) Of the 22% of information professionals in state and local governments, the breakdown, in contrast to industry was

Computer field	12%
Education and training	29%
Library	19%
Information services (non-library)	15%
Management of function	10%
Others	15%
	100%

iii) In the federal agencies employing only 5% of all information professionals, about half of these work primarily with computers, 15% within management support, 18% with non-library information services, 8% each in research and library work fields.

iv) Only two per cent of all information professionals were engaged by colleges and universities. They include

Librarians	33%
Education and training personnel	27%
Computer personnel	23%

Of those engaged in education and training in this sector, only one-half held appointments in school/departments of library science, information science and computer science. The rest were distributed in other disciplines and professions, an interesting trend indicating the all-pervasive nature of information.

3) *Information Subunits*

The distribution of information professionals among the subunits of organisations was as follows:

Computer operations	33%
System analysis/programming	24%
Library/Archives	10%
Management information system	10%
Others	23%
	100%

4) *Work fields*

The predominant work field that employed the largest number of information professionals was the computer field (40%), followed by management support (10%), library (10%), non-library information services (10%), and others (30%).

Occupational Titles

There were around 1500 unique occupational titles reported by the 1193 respondents, representing the four different sectors. Two main findings were that occupational titles varied substantially among the sectors, even though the functions performed were the same; and that even with a relatively unambiguous function such as "Searching for data and information on behalf of others", a wide range of titles was reported.

Other useful data

The survey presents the mass of valuable data collected, in 79 tables, some of them being elaborate and detailed. A bibliography listing 162 items, largely representing literature published between 1965 and 1980, fairly representative of work done in different parts of the globe, is given. An extremely useful list of professional associations, societies, and groups of interest to information workers is also given. A list of the principal colleges and universities in the United States and Canada with programmes of study in information is also given. The sample letter and questionnaire used in this occupational survey of information professional (1980) is appended at the end.

Implications and Conclusion

Glynn Harmon, an eminent progressive thinker in the information field and a member of the National Consortium for the Information Profession, has made a useful contribution incorporated in the first chapter of the Survey Report by focussing attention on some of the far-reaching implications of this survey. The points that he has made are summarised below:

The survey has identified a rather heterogeneous group of workers who have their separate distinctive characteristics, but are bound loosely by a thin thread of their involvement in information handling. Indeed, each of the subgroup is having its own worldwide views, parochial approaches, basic tradition, assumptions, jargons, territorial claims, propensity for Darwinian struggle - survival of the fittest. The groups represent such diverse areas as computer science, data processing, technical writing, library science, management information, command and control, research and others. Each of these occupations has a bias towards particular technologies, methods and traditions, institutions, functions, clientele, share of markets, resources, followers and political influences. Notwithstanding this heterogeneity, the survey has demonstrated that these groups share a common concern associated with concepts basic to information flow. The common basic approaches are largely determined by the paradigms such as input, processing, output, memory, small/large system, subsystems, and also communication and managerial paradigms. This conceptual unity inherent in information handling problems should harmonise the parochial interests and eventually lead them to adopt a unified approach. The further identification and promotion of new paradigms would perhaps provide additional bases for an emergent confederation of information professionals.

This may ultimately lead to a more uniform position classification and equitable salary structures for information professionals as a whole.

There are too many definitions of the term 'information'; in fact, many thinkers have found the term too elusive to give a definition acceptable to all. 'Information professional' is inexorably linked with information. Therefore unless there is a rigorous definition for 'information', particularly for studies such as the present one, no meaningful conclusions could ever be drawn. Additionally, the unit of information and its quantitative measurement relating them to measures applied to energy, time and value would serve the task of system design and development as well as occupational classification.

The results of the survey have far-reaching and penetrating implications for education and training of information professionals. Presently educational programmes are offered by a variety of schools/departments such as library science, information science, computer science, communication, education, business and public administration, industrial and electrical engineering, mathematics, philosophy and so on. "Information professionals and users alike should not be excessively tied to any single cultural outlook or world view (humanities), technology (data bases), institutions (library), function (indexing). Information professionals and users often work jointly to bring inter-disciplinary world views, subject knowledge and information resources to bear on the resolution of problems. Perspectives can be inappropriately sacrificed to the intensity of specialisation."[6] Glynn Harmon feels that a fresh approach is necessary for evolving a new school - department that would reflect a broader system orientation not tied to a specific institution or technology. This should facilitate greater mobility and flexibility of information professionals to transfer job experience from one technology or organisation to another.

A review of the curriculum structure of basic educational programmes has become essential, perhaps urgent, in the context of the expanding dimensions of information.

Inferring from the survey results, Glynn Hormon suggests that a core curriculum would have to begin with a set of concentric circles starting around system sciences and expanding to include selected basic concerns of management and management decision support, theory and methods of research, library science, education and learning, finance and so on. Specialisation in institutions, technology, subject area, and functions could come after the basic exposure to the core areas. Perhaps special attention should be given to the information systems for industry and business which absorbs a substantial proportion of information workers and to develop managers of information resources.

While universities and colleges should concentrate primarily on professional education aspects to give a broad perspective of the field, its philosophy and overall development of the ramification of the subject including operational skills and management. Training and imparting specific skills in different operations should be performed within industry and government. Industrial organisations are in a good position to offer on-the-job training to their personnel in the development of use of up-to-date, on-site technology and to incorporate such training into efforts like system conversion and project management. Such facilities are not normally available in educational institutions.

Another important implication of the survey concerning specifically the library community is that the role of library professionalism within the broad field in the information professionalism appears to be shrinking. Only 10 per cent of 6.4 million of information professionals were identified as librarians; only 7 per cent of the information professionals constitute librarians in industry; 19 per cent State and local governments and 8 per cent in the Federal government. These clearly indicate the smaller market for librarians particularly in the expanding sector of industry.

As information gathering and use are fundamental to all individuals, Glynn Harmon stresses the importance of providing instructions in the use of information right from the elementary school onwards to higher levels. The instructions should also relate to basic knowledge of using information tools and techniques on the part of the general public.

Some general observations with particular reference to India

Although the situation obtaining in US is not certainly analogous to that in India, the survey should serve as a catalyst to initiate action on manpower studies in the information field in India, assuming that thinking on this important area has already commenced. The heterogeneous variety of groups of information professionals in US identified by this survey, is slowly emerging in India perhaps with magnified prejudices, inadequacies, parochial interests and political influences. If Glynn Harmon's observation clearly brings out the desirability of unifying these disparate forces in US, if only to bring about a greater measure of harmony among them, there appears as much need in India also to evolve a confederation of information professionals with a common ideal. As we in this country are at the initial stages, it will be in the interest of all concerned and to the basic problems of information handling that a National Manpower Consortium for the information profession is formed at the quickest possible time. Institutions like INSDOC, PID, NISTADS, Manpower Division of CSIR, DRTC, NIC, NISSAT, some of the University Schools of Library and Information Science, Management Institutions, Professional Associations, National Institute for Applied Manpower Research, etc. should be represented in the Consortium. A unified approach could evolve from the very beginning and could lead to the formulation and sponsoring of research projects on manpower studies. Eventually these measures could be expected to lead to the setting up of an institute for advanced studies, research and development in information studies.

References

1. Bell, D.: The coming of the post-industrial society. New York, Basic book, 1973.
2. Machlup, F.: The production and distribution of knowledge in the United States. Princeton, N.J., Princeton University Press, 1962.
3. Porat, M.U.,, Rubin, M.R.: The information economy. 9 vols. Washington, D.C. Washington Printing Office, 1977.

4. Porat, M.U.: Communication policy in an information society. (*In* Communication for tomorrow: Policy perspectives for the 1980s, ed. by Glen O. Robinson, New York, Praeger Publishers, 1978), 3-60.

5. Debons, A. *et al.*: The information professional; survey of an emerging field. New York, Marcel Dekker, Inc. 1981. p.30.

6. --- p.15.

APPENDIX

1. **Managing Information Operations, Programs, Services, or Databases.** Includes planning, directing, or administering information operations, programs, services, or databases; establishing budgets, funding, and financial control; planning and controlling resource-sharing or networking activities; establishing and implementing security standards for information systems; forming and implementing corporate information policies; integrating information operations, programs, services or databases with mission of parent organization; surveying users to establish information needs; promoting information products and services. Sample occupational titles: *Audiovisual Administrator, Chief Programmer, Comptroller, Database Manager, Director of Information Center, Library Administrator, Library Director, Manager of Publishing Unit, Management Analyst, Media Manager, Science Editor, Vice-President for Information,* etc.

2. **Preparing Data and Information for Use by Others.** Includes technical writing (but not public relations promotions), editing, or other scientific publishing activities involving journals, technical reports, manuals, instructions, etc.; translating business, scientific, or technical works from one language to another; preparing abstracts, indexes, or catalogs; compiling bibliographies, reference materials, or referral materials; preparing lists or directories of people, buildings, events, etc.; establishing a computer numeric or textual data input requirement; transforming data into form required by a computer (or other automated system), operational system, or library; preparing other information materials, such as audiovisual or cartographic materials. Sample occupational titles: *Abstractor, Archivist, Bibliographer, Cataloger, Classifier, Librarian (Research), Librarian (Special Collections), Medical Records Specialist, Science Editor, Survey Data Editor, Technical Editor, Technical Writer, and Translator.*

3. **Analyzing Data and Information on Behalf of Others.** Includes researching and analysis (but not final use) of data and information from a library, computer file, or other database; analysis of data and information that goes beyond (but which may include) such activities as abstracting, or simple summarization of previously-written materials, computer system output, or library materials. Sample occupational titles: *Analysis Specialist, Information Counselor, Operations Analyst, Research Assistant,* and subject specialists (e.g., *Economic Analyst, Financial Analyst, Management Analyst, User Consultant,* etc.)

4. **Searching for Data and Information on Behalf of Others.** Includes diagnosing user needs for information, identifying data sources, and developing search strategies; accessing databases either manually (library shelves) or electronically (automated system); evaluating yield of data searches (but not performing analysis of data); referring users to other sources of data and information. Sample occupational titles: *Information Counselor, Reference Librarian, Reference Specialist, Referral Specialist, Searcher, Technical Information Specialist,* etc.

5. **Remaining Operational Information Functions.** Includes supervising the running of a library or automated information system; controlling and facilitating access procedures; developing and implementing procedures for data input to systems (including library acquisitions); developing and implementing software packages for computer systems; designing applications programs to fit user needs. Sample occupational titles: *Applications Programmer, Archivist, Audiovisual Specialist, Librarian (Acquisitions), Librarian (Medical Records), Librarian (Special Collections,* etc.

6. **Information Systems Analysis.** Includes analyzing existing work processes; determining the feasibility of system automation; determining output product and form; selecting data or information for inclusion in the system; recommending design alternatives; evaluating information systems, products or services. Sample occupational titles: *Computer Systems Analyst, Chief Programmer, Data Processing Systems Analyst, Operations Researcher, Senior Programmer, Software Specialist, Systems Analyst, Word Processing Systems Analyst,* etc.

7. **Information Systems Design.** Includes designing new systems or modifying existing systems; establishing procedures for carrying out work processes; implementing system design; evaluating system output to insure that it meets user requirements; documenting the procedures for use of the system, both for system personnel and for users. Sample occupational titles: *Computer Systems Planner, Database Designer, Methods Analyst, Operations Designer, Senior Programmer, Systems Designer, Systems Project Planner, Word Processing Systems Planner,* etc.

8. **Information Research and Development.** Includes studying the foundations, laws, theories, and postulates related to information and information systems, operations, programs, services, or databases; performing research on new forms of information systems, operations, products, processes, and services; developing models of information systems or operations; designing, collecting, and analyzing secondary and primary data in information research; research on the use of information systems, products, or services; research on information user behavior and characteristics. Sample occupational titles: *Communications Researcher, Computer Scientist, Information Scientist, Library Scientist,* persons with methods expertise (e.g., in Operations Research, Psychology, Statistics, Systems Analysis, etc.) and persons with subject expertise (e.g., in Behavioral Science, Engineering, Mathematics, Philosophy, etc.).

9. **Educating and Training Information Workers.** Includes teaching courses on information subjects to undergraduate or graduate students; training information professionals or other workers on the job, or in workshops or seminars; planning information education programs; developing information curricula; research on information education. Sample occupational titles: *Faculty Member (College or University), Instructor, Lecturer, Training Officer,* etc.

LETTERS TO THE EDITOR

A recent report by Sharma, Singhal and Gupta[1] in the Annals discusses a model for evaluating the impact of research paper through a modified mode of citation analysis. In this paper Sharma et al pay more importance to the number of different citers than the usual technique of considering the total number of citations during a specified time period. The authors have set out the model on the direct analogy of electron lattice scattering and the mathematical results have been directly borrowed from the physico-mathematical formulation of that topic.

This note comments on a number of aspects of that paper.

(a) *The typical nature of awareness and stimulus effects of a research paper*

Generally it takes a certain period of time for a research paper to be published in a final form and to reach the readers. It is possible that a potentially interested reader will notice the publication after some more time lag through some indirect mode or channel. But in many cases, before the final publication of the paper, the basic results become known to at least a portion of the potentially interested persons. But there is always a catching-up factor for a research result or a new idea set forth in a research paper to be used by some other actual worker (a subset of the set of potentially interested readers) who eventually becomes a citer.

The authors of the article seem to be aware of this factor but have not considered it in their model [assumption (v) of their paper, p.56]. But it is also a fact that a major portion of the papers never catches up. There seems to be a possibility of an investigation by quantitatively defining 'the catch-up factor' to find out what percentage of papers or research results really catches up.

Without going into actual measurements, by empirical and heuristic observations it is possible to comment theoretically that for each paper, after an initial stage, number of citations should increase with time and reach an optimum level, stabilizing more or less for a while there and then go on decreasing. So we may say that there are in ideal cases, four components in citation curve against time for a research paper or a bundle*. First, a phase of dormancy with very few citations or only self citations over a period; second - the catching up phase, a phase of gradual growth; then the third part of a peak or roof for optimal stability and fourthly the fall. The length of the first part, steepness of the second, steadiness of the third and inclination or slope of the fourth together determine the importance and impact of the individual paper or the bundle. There are few exceptional modes. In some rare occasions the first part may be quite long. In other rare cases, there may be more than one peak, which would indicate recurrent and renewed impacts being drawn from the paper. Such a thing happened with Raman scattering after the discovery of Laser. But even in such cases, if the earlier peak had been high enough the roof being well spread over, second crest becomes a minor one. Because such works already become assimilated with the body of basic knowledge, so they are referred but not cited.

The general mode as has been suggested above has been discussed not in terms of citation counts, but for direct total growth in research publications in a specified topic by Goffman[2] in his epidemic model. For citations also, I feel, similar growth models are applicable. It should, however, be noted that majority of the papers never catches up and their whole citation lives are nothing but the extension of the first phase.

(b) *Awareness of a work versus its actual citation*

The second assumption of the authors "that the collision of a potential citer with a research paper will result in scattering meaning incorporation of the research paper for the ready reference" and the quoting from Cole & Cole that "high quality work done in one speciality is known almost to all physicists regardless of their speciality" need some comments. 'High quality work' is in itself a vague term. A work is regarded as of high quality when its immediate impact is felt. Measuring criterion for that is the number of further researches, discussion and incorporations in various documents and the number of references or citations it produces. Though basically it has an implied action i.e. whether a major breakthrough has been achieved. 'Major breakthrough' is again another description which is somewhat high above the earth. In more down to earth terms it means solution of a long standing problem or a generalisation embracing a number of related or unrelated matters or an idea or a result directly contrary to currently accepted concepts, beliefs, norms or a simplification in methodological and conceptual levels.

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* *by a bundle I mean the group of papers delineating the same ideas or a single research spanned in a number of publications by the same author/s.*

It is also a fact that almost every seemingly important work is noticed by or brought to the notice of majority of workers in related fields (even in remote fields). Only a very few of them are potential citers in most cases. Even unimportant works in specific and related fields are noted, browsed and read by the members of a research group. In case, they are not directly linked to the field of noticing workers, they do not result in scattering. An important point has been considered in assumption (iii) of Sharma et al that there is an optimum size or limit to the citations in each paper. Eventually, only more important, directly linked, more uptodate papers find place in citation, others do not just qualify. A paper which creates impact on large number of research workers and in minute and diverse subfields of research, needs to be highly general and fundamental in nature. Examples are Einstein's on Brownian motion, special theory of relativity, photo-electric effect, or Watson-Crick work on DNA structure.

Instead of taking total citations-rate, consideration of the number of citers per unit of time as a measuring parameter is a commendable novelty. This has more far-reaching implications than authors could suggest. However, I personally feel that a more suitable parameter could be an index which compounds both the number of citations and the number of citers per unit of time. I would like to suggest the following index:

$$C_c = \frac{C_r - C_s}{N_r - N_s}$$

Where C_r is the number of citations say per year, C_s is the number of self citations within same period of time, N_r- the total number of citers during the time and Ns- the number of self citers. Self citer should include all the members of the same group working together, on the same problem, under the same leadership and at the same organization (better to specify as same laboratory or same section of a department of an institute).

By considering such an index we shall be able to gain more insights as to the citation clusters, clamps, links and impacts. If the citers can be grouped, say for example, according to regions, or fields of research or journals, the impact of diffusion will be known and it will be possible to correlate many things. For example what is the correlation of journal impact factor with citer impact factor (or in the authors' term absorption index of activity).

Now we can consider citation analysis against several indicative parameters and by comparing the outcomes thereof we can set up new norms of deductions. These parameters or indexes are: i) number of citations, ii) number of citers, iii) number of self-citations, iv) number of citations minus the number of self citations, v) C_c as defined above, vi) citations in journal levels, vii) citations in subject or topic level, viii) citations in regional level, ix) citations in language level. More theoretical and experimental works in these respects are highly needed and will lead to interesting outcomes in the chain of Garfield doctrines[3]. In another paper in the same volume of Annals, Gupta (one of the authors of the paper under discussion) has presented a study of citations at journal and country levels (points vi & vii above) but without any statistical analysis at depth or attempting at any model. He however has not studied individual papers separately[4]. Sinha & Bhatnagar in yet another paper in the same issue[5] studied in detail citation distribution of papers of a single author, a plant virologist. Though they have meticulously tabulated self-citations and citations by others, they have not attempted to derive any feature of impact. They have also tabulated citations -- life spans of individual papers but have not segmented them in phases. Their views regarding the causes of citation trends is almost simplistic. These show that observational and experimental studies are being done vigorously in citation analysis, but these have not been coordinated or analytically organised in many cases.

(c) *The model:*

It is a general tendency in the presently growing field of social technologies[6] to borrow concepts, terms, models, mathematical structures from the more stable fields of natural sciences especially from physics, chemistry and related technologies such as electronics, communications, etc. This in itself is not undermining, detrimental or bad. But frequently such attempts and tendencies become far-fetched and irrelevant. Mathematics in itself is a formal science, structured manifestation of deduction in contrast to empirical sciences. It (Maths) however, feeds the empirical sciences by way of interconnecting empirical concepts among themselves and with observables and abstract notions.

A single mathematical structure may serve for models in different empirical and conceptual situations. Simpler examples are exponential, hyperbolic and conicoid functions. Thus a large number of diverse situations (having no correlation or phenomenological compatibility) can be represented by exponential function. Who will dream of the equation of unitary method involving workers, work and time, to have any analogy with the gas law except that both of them have the same mathematical form as $xy=kz$, where x,y,z, are variables representing in the first case the number of workers, the time and the amount of work and in the second case the pressure, volume and temperature of an ideal gas. K being the arbitary constant.

So I find no need or relevance for reference to the electron scattering in crystal lattice for using the model or deducing the result. In fact, the authors have not even used the physical analogy excepting cursory and arbitrary references.

Probably, they got their clue in the physical approach of the phenomenon, but that does not warrant such an elaborate description. It is not known whether they wanted to establish the rigour and quality of their approach by referring to a model of a prestigious subject like physics.

The authors have themselves indicated their implicit awareness of the fact that almost the same model manifests itself in radioactive decay modes- from which the information scientists have adopted their notion of 'document half-life'. Moreover, the same model is applicable wherever there arises the question of averaging (weighted) of stochastic processes. The integration-summation passage is also obvious. Almost everybody with a background of college mathematics and elementary statistics knows these things. The parameter also appears as the mean free path or collision free path in kinetic theory in a similar manner. Why instead of this or decay mode models, a more complex and cumbersome approach was adopted may be anybody's guess, but beyond my rational apprehension.

The only thing which matters is the adoption of a suitable form of function which in this case has been taken by the authors as negative exponential. One may think that to adopt the equation in this form necessitated recoursing to electron lattice scattering. It does not appear to be so from the paper. The second section where E.L.S. has been described and the fourth section where the citer number equations and index have been presented have no relation or connection. Only link I can find is defining of AIA or absorption index activity.

This AIA is nevertheless an impact factor. This could be called by any name after bringing forth its equation and defining its utility. The presentation of the model could be straightforward, direct and simple. In any case, possible interactions in a stochastic process is to be accounted for by an equation of the sort dn=kndt, if n is a function of t. It is also natural to consider growth of a population, where regeneration or degeneration sets in, in exponential (+ ve or -ve) formulations as--

n = no exp kt (growth/regeneration)
n = no exp - kt (decay/degeneration)

I have nothing against their definition of I (equation 4, p.55) and the results obtained by actual experimentation. In my opinion, this is a genuine good research.

Finally, I like to add that Sharma et al in their paper have put up a novel approach by taking citers as a parameter and defining a new impact index. The paper no doubt has provoked thought, even though I disagree with their approach. I am making these comments here, firstly, to express my thoughts regarding further investigations, as a direct impact of this paper, and secondly to draw attention of all investigators in our field to the fact that the excellent ideas should not be veiled by false analogies or borrowed structures of models without obvious reasons. Distinctive features of mathematical analogy and physico-phenomenological analogy should be kept in mind.

Useful discussion with Shri U.N. Singh is thankfully acknowledged.

REFERENCES

[1] Sharma, D K; Singhal, Lokesh and Gupta, B M. Electron scattering technique for citation analysis and evaluating the impact of research papers. Ann Lib Sci Doc 1980, 27(1-4), 52-60.

[2] Goffman, William. Mathematical approach to spread of scientific ideas: the history of Mast cell research. Nature 1966, 212, [Reprinted in Saracevik, T. *ed.* Introduction to information science. N.Y. & London: Bowker, 1970, p.65-69 & A general theory of communication ibid. 727-747].

[3] Garfield, Eugene. Various articles, most of which are to be found in 3 volumes of his collected essays, starting with citations indexes for science. Science 1955, 122, 108.

[4] Gupta, B M. A citation analysis of internal and external connections of a research branch. Ann Lib Sci Doc 1980, 27(1-4), 61-65.

[5] Sinha, S C and Bhatnagar, I M S. The information profile of a plant pathologist: a bibliometric study. Ann Lib Sci Doc 1980, 27(1-4), 106-113.

[6] Sen, S K. A note on the idea gene and its relevance to information science. Ann Lib Sci Doc 1981, 28(1-4), 97-102 [for a brief definition of social technologies].

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BOOK REVIEWS

O C L C: its governance, function, financing and technology, by Albert F Maruskin. New York: Marcel Dekker Inc, 1980. viii, 145p. [Reviewed by R Satyanarayana].

"Whenever more than two units (e.g. persons, organizations, or computer terminals) are connected and share some attribute, a network is formed." Thus we have several types of networks. 'Networking' is somewhat a complex term and requires to be viewed from a variety of perspectives in order to gain correct insight into its various benefits. *Penniman, *et al.* have very clearly projected the benefits and disadvantages (Table 1) associated with networking insofar as information service sector is concerned. However, it must be stated that networking has become a major breakthrough on several information-related fronts over the last decade.

There are three types of networking which may be said to have considerable impact on information services. These are: communication networks, computer networks and library and information networks. Communication networks are made up of transmission lines, concentrators, switching mechanisms and non-data processing components. Computer networks are rather complex to identify. Most of the definitions imply multiple computers linked together *via* some means (possibly communication network). In other words, a single mainframe of a computer linked to terminals with internal capabilities equal to a small computer (i.e. intelligent terminal) may constitute a computer-network. Information networks in the broadest sense can be any formalized system of information exchange. But, in modern information networks, technology is utilized to link *libraries, specialized data resources,* or *individuals* to the persons or *institutions in need* of information. It was not until 1960's, however, that libraries could be linked by telecommunication to central computer facilities built around a bibliographic database. From this developed a network structure that made new technology available to libraries across the country.

The publication under review is about OCLC, an online computerized network, with headquarters in Columbus, Ohio. It comprises *four* chapters. Chapter 1, contains introduction, which traces the emergence of resource sharing concept among the libraries in America. *The chapter* establishes the need for resource sharing enumerating the efforts made in the past in this direction. The discussion on library resource sharing is meant to provide the back drop for a full understanding of OCLC. The introductory chapter ends with a fine quotation from Jacob Bronowski that "democracy of the intellect, based on the wide spread availability of knowledge and information is essential to the continuity of man's ascent" which makes an excellent case for the development of library resource sharing.

The second chapter entitled "historical background of OCLC-1967 to the present" furnishes us the information necessary to understand the landmarks in the evolutionary pattern and development of *OCLC Inc,* which less than 10 years ago, was only the Ohio College Library Centre, a membership organization providing academic libraries in Ohio with cataloguing information and catalogue production, *into a major impetus* in the automation of library technical services *providing a base* for the development of a *nationwide,* computerized *information network.* Some of the important conclusions that could be drawn from the formative period of OCLC are:

i) The Ohio College Library Association (OCA) was mainly responsible for the formation of OCLC.

ii) Parker-Kilgour report formed the main basis for the formulation of OCLC Library network by OCA in 1966.

iii) OCLC became a corporate body chartered by the state of Ohio in June 1968, and F Kilgour was appointed as its first director.

iv) An off-line catalogue card production system became *operational in 1970.* The system utilized xerox sigma 5 computer, Irascope LTE Terminal and the design of OCLC telephone network.

v) The OCLC on-line system began with one library in the year 1971.

vi) In 1975 the advisability of extending the membership of OCLC beyond Ohio was discussed and the Board of Trustees of Ohio College Library Centre were asked to go into the merits of the case and report the results.

**Source:* Penniman, W.D., et al. Technology Assessment of Information Networking Technology, report to the U.S. National Science Foundation, Battelle (December 15, 1976).

Table 1

Projected benefits and disadvantages of networking within the information service sector

Benefits	*Disadvantages*
Functional	*Functional*
Engineers/scientists spend less time in getting new information.	Quality of research and competition of ideas reduced as a result of standardized information sources.
State-of-the-art reports easier to produce	Overt or covert screening and elimination of information deemed less worthwhile because it differs from the bulk of material in the system ("least common denominator" effect).
Lag time decreased between production and use of information.	Demand for intermediaries increased due to expanded network activity could place information collection/screening in the hands of poorly trained workers.
Form of presentation of S&T information standardized.	
Organizational	*Organizational*
Managerial aspects of networks promote information as a national resource.	Tendency toward monopolies exists in network development.
	Network bureaucracies grow with overhelming power in ability to control information.
	Guarantees for protection of sensitive information are inadequate.
Technological	*Technological*
Competitive market for network hardware could accelerate technological development.	Network hardware cost demands may prevent efficient/cheap operation. Network can become "locked in" to particular hardware and errors in design become prohibitively expensive to correct.
Financial	*Financial*
Increased productivity of S/E personnel could decrease cost of scientific research and application.	Information businesses that compete with networks must join or shrink.
Employment increased in selected sectors or information-intensive industries.	Too rapid development of network will waste money because of technological or organizational immaturity.
	Above results in inflated costs for network services.
Social/Psychological	*Social/Psychological*
Communication capability increased as a result of easier flow of information.	Overreliance on network as information source limits scientists' perspective to that of network gatekeepers.
National problems can be confronted using information as a resource for new solutions.	Browsing and serendipitous discoveries will decrease.
Educational alternatives increased via information networks and CAI.	Fear of loss of privacy via network monitoring could curtail communication.
	Pressure to continue poor networks because of "technological mandate".
	Gap widened between the information-rich and the information-poor.

vii) On the basis of the recommendations of the Arthur D. Little Report, the name of the organization was changed from Ohio College Library Centre to OCLC Incorporated (i.e. OCLC Inc) and a new governance structure came into being.

The third chapter entitled "governance, function, financing and technology of OCLC" is by far the most important portion of this publication. An attempt has been made in this chapter to discern *what OCLC has become to-day compared to what it set out to be in 1967.* In the process, the author presents an analysis that depicts this development from the stand point of OCLC's governance, function, financing and technology.

From what has been written in this chapter, we understand that the first governance structure of OCLC was formulated by Ohio College Library Association (OCA). After about a decade of existence, OCLC has become one of the most widely known library automation networks functioning at the current time and began to grow rapidly. This growth necessitated a change in the governance structure. ***Therefore,*** *the original intent of OCLC* to develop a ***computer-based library network,*** with an on-line information base as its underpinning, to benefit a group of Ohio academic libraries, whose members controlled its operations,***had to be changed***(Table 2). Arthur D. Little was appointed to enage in a study that would result in the recommendation for an enlarged governing structure for OCLC. The responsibilities entrusted to Arthur D. Little were to: 1) assess the possible configuration of developing library network in the United States, 2) characterize the extent of OCLC's network participation and 3) propose to the network the governance make up that would most effectively take OCLC into the future. As a result of the Little study, a new governance framework was adopted for OCLC in year 1977 (Table 2) and the organization was renamed as OCLC, *Incorporated - "OCLC" not being an acronym* but, rather, *the new* name of the network. The original name "Ohio College Library Centre" is no longer appropriate since its activities are not restricted to Ohio, and the system serves all types of libraries.

Table 2

OCLC governance from 1967 to 1978

	Governance from 1967 to 1978	Governance as proposed by Arthur D. Little Study
Members	Restricted to Ohio Libraries	Libraries throughout the United States that contract for OCLC utilities.
Board of Trustees	9, elected by members	Recommend 15; 8 Board-elected; 1 ex officio-6 Users-Council-elected.
Board members	Librarians	Librarians and non-librarians.
Users Council	None	Elected by membership within networks.
Sphere of governance	Centered in Ohio, as required by OCLC constitution.	National in scope, with all member libraries taking part.
Members	All participating libraries are General Members. Currently about 2000 libraries in 50 states.	
Board of Trustees	Includes 15 persons: 8 Board-elected; 6 Users-Council-elected; 1 ex-officio.	
Board members	Librarians and non-librarians.	
Users Council	Member-elected from participating libraries.	
Sphere of governance	Nationwide; through Users Council all participating libraries are involved in policy decisions. Reflects nationwide scope of operations.	

Source: *Adapted from Arthur D. Little. A New Governance Structure for OCLC: Principles and Recommendations. Metuchen, New Jersey: Scarecrow Press, 1978, p.13.*

As amended, the OCLC governance structure can now be described as one which is made up of two notions: a *'network cooperative'* and a "tightly-held, not-for-profit corporation". *Members* of the organization *are all user* libraries regardless whether the library is a member of an OCLC affiliated network. Participative management takes place with the opportunity to elect delegates to the 'Users Council'. The Board of Trustees includes 15 persons, who can serve for two continuous six year terms. The Board of OCLC today has become a complex organization in contradiction to its composition at its genesis. Along with the Executive Office, OCLC includes the five divisions indicated in Figure 1.

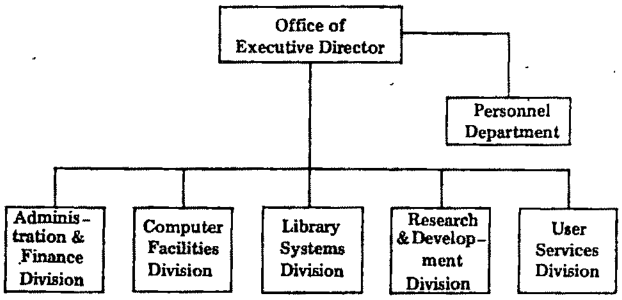
Office of Executive Director
Personnel Department
Adminis-tration & Finance Division
Computer Facilities Division
Library Systems Division
Research & Develop-ment Division
User Services Division

Figure 1: OCLC organizational chart.

The 3rd Chapter also discusses at length the function associated with OCLC. Some of the important points worth noting are that when OCLC activated the on-line union catalogue and shared cataloguing system, the main capabilities of the system were the display of union catalogue location listings and on-line cataloguing using L.C. MARC records. The user libraries *were not able to input new records into the system.* The capability to input by the participating libraries was added in 1971. The present status of the function components of the OCLC is summarized below:

Financing is another important aspect discussed in this chapter. A discussion of OCLC financing from its early years to the present is contained in this section. OCLC has shown impressive financial growth when comparing, for example, its budgets of *1967-68* and *1977-78*. In the beginning, OCLC depended a great deal on combining the financial resources of the participants of the network, with the intent of developing a resource sharing network. This was an example of institutional cooperation to develop computer-based system that was not, for a variety of reasons, available to individual libraries. Its future continued financial growth and stability appear to be rather assured. With a budget of 18 million for the year 1978-1979, OCLC anticipates an annual budget of about $ 100 million in the subsequent years.

The next important aspect discussed by the author in this chapter is the *technology associated with OCLC*. This discussion, certainly furnishes some guidance to those desirous of developing information networks in our country. As the record shows, from the beginning the OCLC system has developed in a building block fashion, each phase dovetailing with the succeeding ones. In the first phase of operation, the OCLC was to provide catalogue cards off-line to the network users. The main problem at this stage was to locate the equipment which could be utilized to run the computer programs that already existed to produce catalogue cards to user specifications. These programs formed part of Yale Bibliographic System. The computers used at Ohio state were the IBM 360/75, IBM 360/50, IBM 7094 and IBM 1620. In addition, it was necessary to use the Maryland-Michigan Operating System (MAMOS) into Ohio State's IBM 7094 computer in order to operate Yale System. MAMOS was a subsystem of program language compilers. Not only this, the OCLC based its operation on the availability of L.C. MARC records. MARC tapes received at OCLC were put through a preliminary processing procedure and then sent to a conversion and file maintenance

	Funcation	Operational Stage
1.	Shared Cataloguing	Fully operational.
2.	Serials Control	Partially operational; initial problems with the subsystem have dictated a re-evaluation of the system.
3.	Interlibrary Loan Communication	Operational stage just begun. Initial reaction from users very favourable.
4.	Acquisitions	In development; beginning of operational stage unknown.
5.	Subject Retrieval	In development; OCLC/Battelle Institute experimental stage funded summer 1975, using Battlle's BASIS programs; beginning of systemwide operational stage unknown.
6.	Remote Catalogue Access and Circulation Control	In planning stage

program (CNVT) that was operated on IBM 360/75 computer. One of the major programs, CONVERT (CNVT) performed the chore of making current primary bibliographic store based on function codes that were a part of MARC entries. There were two types of characteristics to the card elements: fixed and variable. Fixed characteristics could not be altered by the user, while variable ones could be altered according to the needs of the user. It may be stated that OCLC and the participating libraries had the advantage of ideal instructional experience as a result of the off-line phase taking place as a prelude to the next phase, that is the on-line system.

The significant aspect of the second phase is the use of CRT terminal for on-line cataloguing function. The first CRT terminal, the Irascope LTE is equipped with such elements as cursor control, character insertion, line and page rolling, as well as margin control, moreover a number of diacritical marks available on its keyboard made it more useful. The modem, forming part of the Irascope measured 8x18x12 inches, the size of the VDU was 17x20x20 inches, the typewriter keyboard associated with the terminal formed its third part. The use of this terminal created some problems concerning the quality control and many users were not satisfied with it. Because of this the OCLC had to go in for a terminal model of its own. The OCLC *Model 100 belonged to a second generation of CRT* terminals. It was a self-contained, operator and computer-controlled, remote display terminal with a detached keyboard. The terminal was designed for serially transmitting information to, and receiving from, an inter-connected data source. It was meant for exchanging data at any of pre-selected speeds of transmission, *the maximum being 4800 bauds.* The VDU had the capability of displaying a maximum of *25 lines, each line having 80 characters.* Since 1978, OCLC is using Model 105, which is an improved version of Model 100, with enhancements which were incorporated to improve the quality of the device. After the experience with off-line system for an year, the OCLC started the on-line system. The system was operated using *Xerox Sigma 5 computer.* The principal elements of Sigma 5, included the following: *the central processing unit (CPU), three banks of core memory which included a total capacity of 48 thousand 32- bit words or 192 thousand 8-bit bytes.;* a high speed disk secondary memory; 10 disk pack spindles having a total capacity of *250 million bytes* with two additional spare spindles; two magnetic tape drives, two multiplexer channels, five communication controllers; a card reader, card punch, line-printer and six Telefile disk drives. The character code used was Extended Binary Coded Decimal Interchange Code (EBCDIC). Sigma 5 had memory capacity of *256K* and it included *On-line Bibliographic Monitor (OBM),* which was an element basic to this computer configuration. The system's database and access indices were both contained in ten *xerox dual density disks.* The catalogue cards were printed using an IBM 1403 line printer. The OCLC ran the on-line system using Sigma 5 computer between the *period 1971-1975.* When OCLC began to add new user terminals at a fast pace, Sigma 5 began to reach its saturation point and hence to cope up with the increased demand, another computer Sigma 9 was purchased for the OCLC and *the dual computer system became operational in 1975.* As the new system became more reliable, the number of participating institutions went on increasing. Therefore, OCLC had to enlarge its computer configuration. This marks the third phase of the development of OCLC technology. At present, the OCLC is having a processor configuration with *four tightly coupled Xerox Sigma 9* computers that operate in parallel. The character code used is EBCDIC. This system has a two-part memory capacity: 128K *words of private memory* and 128K words of *common memory.* The system data base is handled by a *ten data base processor computer system* with the name of the *Data Base Processor* (DBP) manufacutured by Tandem Computers. The OCLC database now resides in *40 disk drives* and contains nearly *5 million bibliographic records!* The communication functions of the network are controlled by a system of Digital Communications Controls (DCC). The system consists of ten, '116 minicomputers' each of which handles 11 telephone lines of the entire dedicated,leased synchronous telephone line system. This system serves as a link between OCLC computer facility located in Columbus, Ohio, and CRT terminals in different libraries located in every state of USA and Canada. The application code both for *Sigma 9's* and the minicomputers is written in *assembly language.* The applications code for Tandem System is the Tandem Application Language.

Important to the entire OCLC on-line system, is the fact that the Tandem Processor acts as a safeguard for the OCLC file whenever the host processor configuration breaks down. The usability of the system is greatly enhanced as the result of DBP. The addition of Sigma 9 computer made it possible to stabilize the response time of OCLC network.

After reading the author's narrative about the technology associated with OCLC in all its evolutionary phases, one can definitely gain an insight into the various problems associated with the design and operation of an on-line bibliographic information system on a national basis.

The fourth and the final chapter of this publication provides a critique on OCLC. Some of the points discussed in this chapter pertain to the planning, administration and control of OCLC—the problems and pitfall as viewed from the point of performance over the years, and the impact of OCLC on the library community as a resource sharing network. Discussing the primary objective of OCLC namely "reducing of the rise in rate of per-unit cost of cataloguing or in other words, to realize for greater output of the technical services staff" the author says that some intangible savings can be realized by freeing the cataloguing staff and allowing them to attend to other responsibilities. Another intangible benefit realized from the use of OCLC system is described as professional satisfaction. In the opinion of many professional librarians, use of OCLC gives them professional pride and self satisfaction. This is because of their involvement in the new wave of library technology. For any library using OCLC there are several areas of routine procedure where OCLC offers the potential for cost savings. These areas are:

1. Catalogue card preparation
2. Bibliographic search time
3. Physical preparation of materials for patron use.
4. Filing
5. Preparation of new materials lists
6. Replacement of bibliographic tools.

The other benefits discussed in this connection are reduction in long delays in processing of library materials and improved services to the users.

On the debit side, the author points out that though OCLC *promised six subsystems* as parts of its overall functional component, only the shared cataloguing subsystem developed well and the other subsystems are yet to be realised. The author also refers to the prevailing criticism that the OCLC data base lacks quality control. This is due to the participating libraries furnishing their input data in a non-standardised format. Although, there is within the OCLC system, the capability of regulating the user input, this capability has not been developed to effectively manage all the aspects of user entry of cataloguing information during the input stage. However, OCLC carries on an effective system of error detection reporting among user libraries. "It seems imperative that, collectively the total network users must strive to ensure that only quality cataloguing is added to the OCLC file." Unless this is done the quality of the data base can not be improved. In view of the large size of the OCLC data base, it is felt that the end users will be greatly served by introducing a subject access method to the OCLC data base.

Concluding the critique on OCLC, the author observes "since OCLC is now a nationwide network, it seems imperative that American Librarianship make concentrated effort to define clearly the role within librarianship of information networks such as OCLC. At present, that definition does not exist. OCLC has steadily grown nationwide, seemingly without any direction from the library community which it is intended to serve".

The book is written in a simple and arresting style and contains copious references to published literature on the subject. It provides an informative reading for all those who wish to learn about OCLC. It can form a useful text book for the students of library and information science and for persons involved in communication studies.

Indian literature in environmental engineering: bibliographical review. Vol. 6, Comp. and ed. by S.K. Kesarwani, S.N. Sinnakar and S.G. Bhat. Nagpur: National Environmental Engineering Research Institute, 1981. 145p. [Reviewed by B.K. Sen].

With the rapid pace of industrialisation and various other factors, the problem of environmental pollution is becoming more and more acute, and as such the world is becoming more concerned to find out appropriate means to tide over the emerging crisis. In such a situation, literature emanating from any part of the world on the subject as well as an effective bibliographical control thereof is of great value. The compilation under review is a welcome step towards the latter

The environmental science, being a highly multi-disciplinary subject hinges on many diverse fields like civic amenities, fertilisers, pesticides, industries, deforestation, public health and so on. Quite naturally, the literature on the subject is widely scattered and it is undeniably a stupendous task to compile a comprehensive bibliography on the subject. It is heartening to note that the compilers of the bibliography made commendable efforts to make it comprehensive, at times, going far beyond the domain of environmental science. In fact, the compilers have ferreted through the pages of even such journals as Commerce, Economic Trends, Khadi Gramadyog, etc. and found out articles of importance.

The bibliography under review includes bibliographical details of 1092 papers published in 179 Indian and 29 foreign journals, and presented in 51 conferences in 1977. The entries have been arranged under 11 major headings, i.e. Water, Waste Water, Solid Wastes, Air Pollution, Noise Pollution, Pesticidal Pollution, Pollution by Radioactive substances, Industrial Hygiene, Rural Sanitation, Environmental Sanitation (General) and Allied Subjects, with, in certain cases, sub-headings. The bibliography is accompanied with author index, subject index, geographical index, list of Indian and foreign periodicals scanned, list of secondary periodicals scanned, and the list of conferences covered.

Papers having bearing upon two or more areas have been refelected under all the respective headings and see references to the main entries have been provided. Numbering of the see references was, however, uncalled for.

In the list of conferences covered, the dates when the conferences were held have not been mentioned in several cases, and in one case, (e.g. International Clean Air Congress) nothing more than the bare name of the congress is given.

The name of the compilation does not reflect the entire content of the document, inasmuch it covers the entire area of environmental science and technology. Some such name Indian Literature on Environmental Sciences and Technology: a bibliography 1977 would have been more appropriate.

These minor faults apart, this bibliography is a well brought out publication and it will be a useful tool both for bibliographers and scientists.

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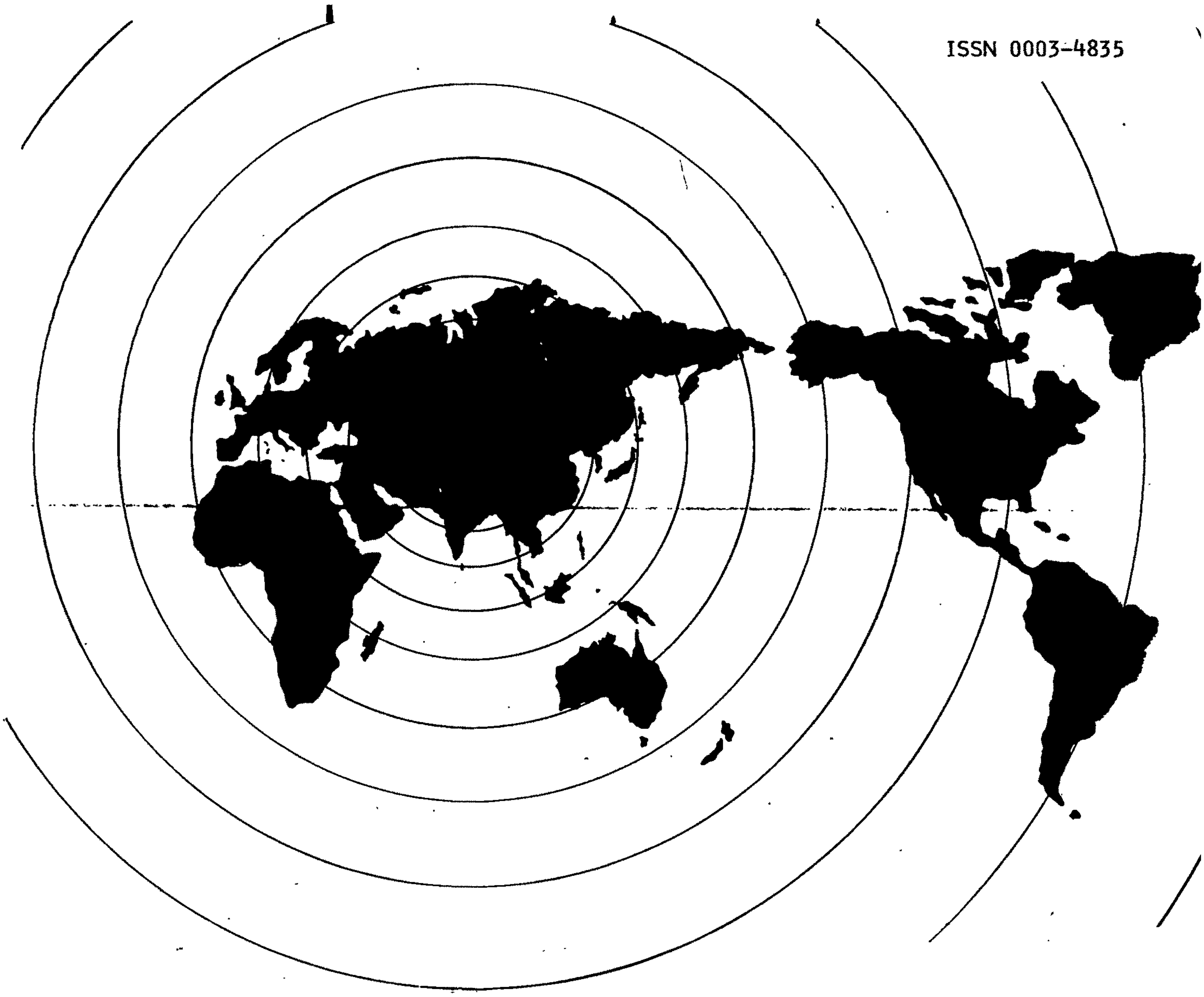

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SYNOPSIS JOURNALS - COMMUNICATION MEDIA FOR A TRANSITION PERIOD

S. DUTTA
ICRISAT
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Rising costs of primary periodicals and increasing delays in the publication of scientific articles in them have created a crisis in communication. Paperless information systems have been suggested by some as a panacea. But it is contended that, for some time to come, print-on-paper will continue to be the preferred communication medium for scientists. However, the present form of primary communication has to undergo metamorphosis to cope with the present situation. The merit of a synopsis journal, as the primary mode of communication, has been advocated and is supported. To give the idea practical impetus, standardization in the contents and format of synopsis journals is suggested. And a plea is made for the wider acceptance of the synopsis journal concept than has so far been achieved.

INTRODUCTION

Periodical publications have been, and remain, the most favoured means of communication for research workers, and most important sources of scientific and technical information. However, over the years, the tremendous increase in the number, size, and cost of primary periodicals has raised grave doubts about the continuation in the future of this popular mode of communication. According to Lancaster[1], the only long term solution of publication problem is a switch-over from a paper-based communication system to an electronic one. It is now claimed that the electronic accessibility of information sources is improving rapidly as the accessibility of printed source is declining. In an excellent review of the evolution of communication media from the ancient Sumerian clay tablets to the modern electronic journal, Seiler and Raben[2] state that electronic publication offers great potential for the communication of information, and predict that we may be on the verge of another Renaissance and the opening of vaster horizons to the human imagination.

This crisis in scientific communication is not entirely a recent phenomenon. As far back as 1947, Bernal[3] outlined a scheme for the centralised distribution of scientific publications to overcome this bottleneck in scientific communication. The chief objectives of his scheme were to ensure that every scientific worker receives, as rapidly as possible and with the least expense, those papers in which he is most interested. This was to be effected not by the radical reorganisation of the methods of presentation of scientific papers, but the existing machinery of the scientific societies was to be supplemented by a distributing body functioning as the agency of the societies and in no way interfering with their editorial functions. The key to Bernal's proposal was the idea of depositing scientific manuscripts with certain distributing authorities. Bernal, who elaborated the scheme during the Royal Society Scientific Information Conference held in June-July 1948, afterwards withdrew his presentation on account of a misunderstanding about the status, nature, and scope of his proposals.

The problem in replacing the journal is that it fulfils a number of different objectives simultaneously. It provides a current awareness service, it has an archival function, and it certifies through publication that a piece of research is acceptable to the scientific community. Scientists do not communicate just to inform. They publish for the sake of recognition, which very often leads to material advancement. The recording of scientific research in an intangible electronic form, or the possibility of the archival storage of papers without peer assessment are unlikely to meet the aspiration or approval of most research workers. The much more widespread use of synopsis journals could be the answer to this impasse.

THE ROLE AND ADVANTAGES OF SYNOPSIS JOURNALS

A synopsis journal publishes in normal printed form a summary of research achievement in greater detail than an abstract. Concurrently the publisher undertakes to make the full text readily available on demand. The full text is referred in the normal way. A synopsis journal is thus quite different from a short-communication journal. The peer review ensures the credibility of the findings reported - which is not necessarily achieved in the publication of short-communication journals. Hence, publications in a synopsis journal may be expected to have a similar prestige value as that accorded to papers in conventional research journals.

The benefit from an increasing use of synopsis journals would be three-fold. First, the literature explosion would be contained. Not that the number of publications would come down, but their bulk would - by 5 times or more (it is assumed that, on average, a scientific paper runs to 10 pages). Secondly, scientists would still be able to cite published papers, instead of quoting some non-descript code number indicating the location where the full text of the paper is deposited. Thirdly, there would be considerable saving in printing costs (also great saving in paper, which is in short supply), as the full paper would not normally be printed. Microform copies or photocopies from the original typescript submitted could be provided on demand. Since, on average, demand for a single paper seldom exceeds 100, this system would function quite well. In exceptional cases, if the demand for copies is high, simple offset printing from the original could be done.

A further, indirect, benefit would be derived in research libraries where much space could be saved. The oft-repeated suggestion for saving space by converting the conventional periodicals into microforms has not found much favour in actively used libraries. But synopsis journals, being thinner than conventional journals per published paper, would require less storage space.

It is not enough if, to cope with the rising cost and inordinate delay in the publication of scientific articles, they are stored in an electronic medium. Their existence needs to be well publicised. To reach beyond the periphery of invisible colleges, the printed medium - for both primary and secondary journals - is still the preferred mode of communication, and will remain so for a very long time to come. However, continually increasing costs of primary and secondary periodicals place them beyond the budget of many smaller research libraries. The solution is not a change of the medium in the short term, but a more rational and effective use of the present medium until the switch-over to an entirely new medium is feasible.

JUSTIFICATION FOR THE INCREASED USE OF SYNOPSIS JOURNALS

It is time that the idea of synopsis journals should be given a more serious trial than has been done so far. No revolutionary changes in present publishing practices are involved. The publishing of primary journals by learned societies and commercial publishers, with normal refereeing procedures, would of course continue. The only difference would be that printed output would appear in synopsis journal format. Each complete paper, in final manuscript form, would be retained with the publishers (or a consortium of publishers) or some designated central depositories. The depositories (individual publishers or central depositories) would convert the manuscripts into microfiche or other microforms to facilitate the easy supply of copies on demand. Staff of central depositories, handling a large number of documents, might find it convenient to computerize their operations, including the conversion of the document into electronic form. Since complete copies of the article would be available from one central agency, the problem of royalty - payments to the author could be tackled centrally - and the rate for copies could include the author's royalty.

From the practical point of view it would be expedient not to have too many deposit centres in a country. For example, in India, the Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), Indian Council of Medical Research (ICMR), Department of Science and Technology (DST), could be the deposit agencies for scientific papers. Similarly, the Indian Council of Social Science Research (ICSSR) and the National Library are suggested as deposit centres for social sciences and humanities respectively. While designating any institution as the deposit agency, infrastructure, and manpower available in the centre for handling the task (storage, retrieval, duplication, and dissemination) efficiently, should be taken into consideration.

The above suggestions are not very farfetched. The international STM group of science publishers (Scientific, Technical, and Medical publishers) met in Vienna recently to discuss new developments in publishing technology. During the meeting a major new venture was announced by David Brown of Pergamon on behalf of his company, along with the Dutch company Elsevier, the German company Springer-Verlag, and Blackwell Scientific Publication of U.K. Based on the work carried out by Elsevier Science Publishers these four international houses, acting as a consortium, intend to set up a system which would enable publishers to create a machine-readable store of documents from which single articles could be produced at cost acceptable to users[4].

The feasibility and acceptibility of synopsis journals have also been evaluated by others. A project was carried out jointly by the University Library of Eath University and the Institution of Mechanical Engineers, U.K., to investigate the potential of the synopsis journal concept by publishing and then evaluating *Engineering Synopses*[5]. The conclusions were that synopsis publishing would be popular among mechanical engineers, especially those in management or design work rather than research, though there is some doubt whether it would be sufficiently acceptable to authors. There is evidence that faster and less rigorous refereeing would be acceptable.

Earlier, a limited experiment in publishing synopsis journals was carried out by the *Journal of the American Chemical Society.* It was concluded that there is "an interest in, and need for, a summary journal"[6].

In 1977, the Chemical Society, London, began publication of their *Journal of Chemical Research* in two parts.

(1) Part "S" contains synopses of papers accepted for publication. The synopses are of one or two printed pages in extent.

(2) Part "M" consists of the full texts. These are produced directly from authors' typescripts and are available in microfiche or miniprint form.

It was expected that the synopsis journal (Part S) would be ordered on subscription by individual scientists, while libraries and institutions would like to buy both Part S and Part M.

As part of a wide-ranging study by The Royal Society of the scientific information system of the UK, a survey was carried out by Rowland[7] of the views of authors of papers in synopsis journals. The major survey was of *Journal of Chemical Research* authors, but two smaller surveys were also performed of the authors of synopsis papers in *Production Engineering Synopses* and *Monthly Notices of the R.A.S.* The main findings of the survey were that a synopsis journal in the pure sciences should aim at the maximum speed of publication consistent with the maintenance of scholarly standards, and should publish its full texts in miniprints. However, the launching of synopsis journal requires careful planning and diligent "marketing" to potential authors.

IMPROVEMENTS IN CONTENT AND FORMAT

These findings indicate that synopsis journals could be possible solution to a number of problems in the scientific publication. However, to increase their effectiveness, a few modifications or refinements are considered desirable. First, regarding the *standardization of the content,* it is suggested that each synopsis should consist of four sections : bibliographical details (author's name(s) and affiliation, title of the article, locus, followed by such additional information as the number of pages, references, figures, charts, plates, etc., in the full paper); keywords (to describe the contents adequately - not too many, not too few), an abstract (about 1000 words); and the synopsis proper, reporting the main findings of the investigation.

Secondly, regarding *the format,* it is suggested that the page make-up should be standardized, using two columns (8.5 x 22.5 cm) in an A4 page size, set in 10 point text. Each column would contain nearly 400 words, such that an A4 size page would comprise 800 words without illustrations. Most synopses could, therefore, be accommodated in two pages of a synopsis journal. Advantages of format standardization are that library display and photo - or microcopying are facilitated. Distribution of reprints to the authors would be cheaper and more convenient if the synopsis is restricted to two pages only.

Such format and presentation standardisation would also help in the preparation of the secondary publications. Staff of indexing journals could cut and paste the entries from the bibliographical sections of the synopsis, to produce their own publications. Since no extra composition is involved, there would be substantial savings in time and money. Similarly, abstracting journals could use the bibliographical details, the abstract, and the keywords (optionally) as camera-ready copy, and the text matter could be photographically reduced if required. Prior permission to use the material this way is implied in these suggestions. However, Meadows[8] has questioned the future of abstracts journal, if synopsis journal becomes common.

AVOIDANCE OF PUBLISHING DELAYS

Another problem that is constantly mentioned regarding periodical publications - both primary and secondary - is the delays involved. There may be a delay of several months (perhaps more than a year), from the time a paper is submitted for publication to the time it actually appears in print. There is also a considerable time lag between the publication of an article in a scientific journal and its appearance in an abstracting journal of the order of several months to more than a year.

Delays in primary publication are due to two factors: the process of refereeing and the printing backlog. To obviate the former bottleneck many scientists have suggested less rigorous refereeing. However, there is evidence that reduction in refereeing standards would definitely not be acceptable to the majority of scientists. In supporting this view, the point is made that, in synopsis journal publishing, both refereering and printing delays can be reduced to a minimum by simple procedures. Once a paper is refereed and accepted for publication, it can be quickly published in synopsis form while the full paper undergoes rigorous editorial processing prior to final typing and despatch to a central depository. And, if the editors of secondary publications are permitted - and choose - to use data published in synopsis journals without, or with little modification, further delays in secondary publication may be reduced. The question of prestige and delay times of synop-

LIMITATIONS IN ELECTRONIC PUBLISHING

According to Lancaster, for economic reasons alone the future lies with electronics rather than print-on-paper. Costs of electronic storage and of telecommunications are falling rapidly. Increasing costs of information transfer in print-on-paper form are reducing the accessibility of information. This message is clear that, while pro-rata costs and accessibility, through electronics, will continue to improve, costs and accessibility through print-on-paper can only get worse.

While these trends are unambiguous, there are other factors, besides economic ones, that are worth considering. The foremost point to consider is the fact that all countries are not equally able, technologically and financially, to take advantage of these new developments. Since the progress of mankind is based on sharing a common pool of knowledge, it will be a tragedy if developing countries are effectively denied access to this pool, because of infrastructural deficiencies. Such inaccesibility would inevitably increase the existing gap between advanced and developing countries as pointed out by East and Belking[10].

It is appropriate, in this context, to take a stock of the situation obtaining in developed countries that are in a better position to embrace the electronic age.

In January 1981, more than thirty leaders in the field of communications gathered in Washington, D.C. to discuss how telecommunications are going to affect our lives in the 1980s, with particular regard to publishing, advertising, retailing, broadcasting, and cable television[11]. In a panel discussion on electronic publishing and document delivery, J. Christopher Burns of the Washington Post Company told his audience that the information industry does not demand regulation and standards. Burns was critical of some existing online consumer devices, including *The Source*, which, he said, only provided "cumbersome access to the wire services and subscription to a discount shopping service". According to him, the experience of putting the *Columbus Dispatch* online has not been very encouraging. Similarly, the experience of the British viewdata system, Prestel, has been rather disappointing. In eighteen months of its existence, only 1288 people have bought the special television sets for domestic use. The British Telecom has now changed its marketing strategy, aiming at business rather than domestic users[12].

During June 1981, the Institute of Information Science, Philadelphia, sent the following announcement to the subscribers of the *Science Citation Index*, "In 1980 we announced a new package: the bimonthlies, annual, a preferential rate for using *SCI* online through *SCI*-SEARCH, and the 1980-84 five-year cummulation.... The same package and price were retained for 1981, while we evaluated this new subscription policy..... The package was created primarily to encourage online use. Previously those who could afford it were using SCI-SEARCH. But many academic *SCI* subscribers said they had not because of the relatively high rates. We counted on a large increase in academic online use to cover a substantial portion of the costs of including the 1980-84 comulation. This has not occurred. So it was a serious mistake to try to move too quickly into the online era."

Clearly, there are lessons to learn from these comments. We must hasten slowly and with caution - as suggested by Cleverdon[13] during the 39th FID Congress, September 1978. He has put forth his argument that mechanized information handling has not yet found wide acceptance. Even in North America, where greatest development in electronic communication has taken place, it has been estimated that not more than 8% of retrospective searches in formal information services are made using mechanized systems. In Europe, it is much less. Moreover, he is of the view that introduction of the sophisticated means of information transfer will only accentuate the information gap already existing between the developed and the develping countries.

CONCLUSION

The position is thus clear. We may be heading towards a paperless system, but print-on-paper as a medium of primary scientific communication is going to continue for a much longer period than is predicted by many. However, because the cost of print-on-paper is increasing at a much faster rate than the general rate of inflation, and the cost increase of some of primary and secondary periodicals in the last decade has been of the order of 200 to 300%, it appears unlikely that such trends can continue for long. It, accordingly, appears necessary that the present print-on-paper system should undergo a metamorphosis in order to survive.

It has been the purpose of this paper to suggest that the publication of synopsis journal offers a viable and acceptable medium of primary communication in this present transition period. But in conclusion, the point needs to be made that changes in scientific journal publishing are bound to lead to adjustment consequences at other points in the information network. Over the years, the scientific journal has become part of an integrated system of communication. Any transition from the conventional format to a nonconventional format is bound to effect the whole system. Thus, though the concept of the synopsis journal holds great promise, there are user-need and market-place implications that need to be considered more thoroughly than has been attempted so far. In the words of Manten[14] "Studies are needed about how synopses can be made to function in the best possible way. Authors need to be carefully instructed and the writing and use of synopses must be thoughtfully promoted. Collaboration needs to be encouraged between university staff, research managers, editors, publishers, librarians and others in the world of primary information".

A great deal of debate has been going on about synopsis journals in recent times. Numerous studies have shown that synoptic publication is not only feasible but also desirable in the present context of literature glut. However, as with all other human endeavour, there seems to be a tendency to conservatism in the field of primary communication as well. The synopsis journal idea is a victim of this conservatism. It certainly deserves a better deal.

REFERENCES

[1] Lancaster, F.W. Whither libraries? or, Wither libraries. College and Research Libraries 1978, 39, 345-357.

[2] Seiler, L W and Raben, J. The Electronic Journal. Society 1981 (September-October), 76-83.

[3] Bernal, J D. Nature 1947, 160 (8 Nov), 649.

[4] Campbell, R. Information technology on the move. New Scientist 1981, 90(1256), 630.

[5] Millson, R J. An experiment in synopsis publishing in the field of mechanical engineering. London: British Library 1979. (British Library Research and Development Report No.5498).

[6] Terrant, S W and Carson, L R. Evaluation of a dual journal concept. Journal of Chemical Information and Computer Science 1977, 17(2), 61-67.

[7] Rowland, J F B. Synopsis journals as seen by their authors. Journal of Documentation 1981, 37(2), 69-76.

[8] Meadows, A J. ed. The Scientific Journal. London: Aslib, 1979.

[9] Oppenheim, C and Price, S. Pricing, delay times and prestige of synoptic journals. Journal of Research Communication Studies 1979, 1, 305-313.

[10] East, H and Belkin, N J. Advanced technology and the developing countries: the growing gap [*In* : P.J. Taylor, ed. New trends in documentation and information. London : Aslib, 1980]. 129-133.

[11] Nelson, M. Infotel 1981: the future of telecommunications. Wilson Library Bulletin 1981, (March), 494-496.

[12] Redfearn, J. Viewdata systems. Nature 1981, 291 (21 May), 182.

[13] Cleverdon, C W. Communication networks, their impact and their effect on the future of the profession [*In* : P.J. Taylor, ed., New trends in documentation and information. London : Aslib, 1980]. 124-128.

[14] Manten, A A. Possible future relevance of publishing scholarly information in the form of synopses. Journal of Information Science 1980, 1, 293-296.

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TRANSBORDER DATA FLOW DEBATE

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The paper attempts to provide an overview of the current debate on transborder data flow. It is divided into five sections. The first section provides the definition and basic concepts of transborder data flow. Traces the recent developments in computer and communication technologies and the emergence of computer-communication networks. Describes the reasons and advantages in the international transmission of information. Lists out the broader issues currently under discussion in the transborder data flow debate. This is followed by discussion on the concern for these issues in different countries and how they are perceiving them in their national informatics policies in the next section. The next two sections describe the type and volume of data being transmitted and the various actors and participants involved in the transborder data flow debate. The final section discusses in detail the issues involved in the whole debate namely that of: personal privacy; national sovereignty, independence and power and the social; cultural, and economic issues arising as a result of international transmission of information.

1.. INTRODUCTION

Transborder data flows are broadly defined as units of information transferred and processed in more than one nation state. A variety of similar terms such as "transnational data flows" and "transfrontier data flows" are also used. In Europe, the term "frontier" is preferred over "border". However "border" and "frontier" seems to be interchangeable. The terms "data" and "information" are used synonymously in the transborder data flow debate. In the present context the "data" refers to a set of organised symbols capable of machine processing and transmission. "Information" implies a higher class of data intelligible to human beings. It will also be appropriate here to make a distinction between computer and communication technologies. Seitz[1] defines communication as an activity in which the quality of information is preserved without any alteration of its contents. Data processing, on the other hand, improves the quality of information by transferring or manipulating it. Transborder data flows occur when extraterritorial data processing functions operate at one or more than one termination point in a communication link.

The problem raised by transborder data flow finds its antecedent in the rapid developments and subsequent convergence of computer and telecommunication technologies. Over the last decade, rapid developments have taken place in computer and telecommunication technologies. Each of these separate developments in its own way has constituted a revolution in our capacities to handle and transmit information - at greater speed with greater precision, and with the capacity to deal with greater quantities of information. Computers, in less than two decades, have gone from large-scale centralised super-adding machines used mainly for specialised purposes, to worldwide network of shared systems. The main trends in this are still towards smaller, faster, and cheaper technologies. Recent developments in micro-miniaturised circuits give enormous gains in the performance and reliability with dramatic decrease in size and costs. The microprocessors now rival in capacity and performance compared to room-sized computers of twenty years ago. As a result of these developments, the extended use of computers and their ancillary systems have pervaded many areas of human activities. Large areas of production, service, maintenance and routine information handling of all kinds have come under automated control. Such operations are today increasingly interlinked. This increasing interdependence of these systems in agricultural and industrial production, energy, transport and marketing management and financial operations has been characterised as a new symbiosis between human and machine. The impact of this new symbiosis has already been considerable on various activities of present society.

Similarly, telecommunication has developed through earlier telegraph, telephone and telex systems to a complex global network embracing all of these as well as radio, television, microwave and satellite relays, carrying personal messages; commercial, economic, political, scientific and military information. Taken together, the above two sets of technological developments constitute a core change in the sustaining basis of human society. It is not just the computer and its impact on telecommunication with which we are concerned here but with the convergence and interaction of these developments to create a radically new information and communication environment. The new environment has made possible the following things:

i) Communication by data users and data suppliers can become instantaneous, inexpensive and ubiquitious;

ii) Terminals in one country can communicate with other terminals or data bases around the world either on a real time or store or forward basis, without human intervention of any kind;

iii) Communication and computer links can be used on a point-to-point or network basis and in either direction;

iv) National and international information networks are emerging with having remote access to "host computers"; and

v) Distance and geographical barriers are becoming virtually irrelevant in a cost or operational sense.

The most significant development has been emergence of the international information networks which are responsible for the international transmission of information. There are several reasons why data or information may be passed from one country to another. The owner or user of data may wish to share and control processing facilities or to make use of a central data bank. Often, there are considerable financial benefits and added convenience from such centralisation. Many organisations, of course, are inherently international whether in terms of their purchasing or selling or other trade, or whether they are a part of a corporation which operates in several countries. There are also certain activities which by their nature, can only exist if there is an international communication, e.g. international banking and credit, airline reservations; world meterological cooperation. Similarly, the pooling of international resources and ideas for scientific and technical research are examples of the need for international communication for the furtherance of international cooperation. For all the reasons mentioned above, international data communication in one form or another is essential. International transmission of data are already producing substantial benefits for large international companies either through more efficient management or computer resource sharing. It has also facilitated international co-operation in many areas of scientific research, namely weather forcasting, oceanography, etc.[2].

The transmission of data over telecommunication circuits began in the 1950's, with the early establishment of airline and defence networks. The technology developed by these pioneering systems began to see its applications in mid 1960's in banking, corporate management, government, time-sharing bureaus and so on. The airline and defence network have had an international dimension almost from the begining, but until the end of 1960's, other systems using data transmission were confined to a single country, with very few exceptions. The growth of international data transmission is thus essentially a phenomenon of the 1970's. The speed, accessibility, and interactive capability provided by developments in international networks do make a qualitative difference to the way in which data can be shared and used and to the interdependence of the parties at each end of the link. At the same time, the intangible nature of data transmission and the difficulties of monitoring what is being sent adds to the concern over possible misuse and undesirable cultural, social and economic effects. These concerns fall into following three broad areas:

i) The privacy and security of personal and corporate data, particularly where it may be transported to or accessed from another country which may have low standards of privacy and security than the country where the data orginate;

ii) The increasing international independence created by sharing of data or computing resources between countries and the resulting vulnerability of one country to events or decisions in another which are outside its control; and

iii) The danger of the concentration of data processing facilities in some countries, with a resulting loss of economic opportunities and capability. Furthermore the vulnerability of the concentration of data, both inside and outside of a country's boundaries, can pose a threat to its national security.

2. NATIONAL POLICIES AND CONCERNS

When the various countries in the world consider their information policy issues with which they are faced, they must consider not only the domestic concerns, but also the implication of the international flow of data for their own situations. Broadly speaking these international concerns are focussed on:

i) Major role played by the United States in the supply and use of information resources. At present 85 per cent of the world supply of computers and computer data is in the hands of 10 western companies and IBM provides almost half of it (Table 1)[3]. A bulk of data bases are also located in the United States (Table 2)[4]. These data bases account for 80 per cent of the worldwide transmission and processing of information. Also a considerable portion of official and government information relating to western European countries is held in USA data banks. There is a considerable fear that the existing trends, if unchecked will lead to an unhealthy American dominance over other nation's economic, social and cultural values. The European, Japanese and other Governments with substantial investments in domestic information industries have already begun to view the continued American dominance with alarm. These nations, being strongly apprehensive of the increasing dominance, now aspire to strengthen their own information sector for reasons of national prestige and more importantly, for the present and future trade advantages the information products and services might bring. Despite a growing manufacturing capability, these nations also fear the loss of domestic and foreign markets to American firms offering sophisticated information processing services. They are, therefore, now very much concerned to protect their local industry by augmenting and reorganising their indigenous resources and facilities.

Table 1

Turnover of leading informatics corporations, 1978

In US $m

17,000	IBM (USA)
2140	Burroughts (USA)
1970	Sperry Univac (USA)
1868	Control Data (USA)
1620	NCR (USA)
1602	Digital (USA)
1600	H.I.S. (USA)
1590	Fujitsu (Japan)
1066	611-HB (France/USA)
1039	ICL (U.K.)

Table 2

Reference data bases and data base records : Geographical distribution, 1975-79

(In Number)

Area	YEAR 1975	1977	1979
United States of America			
Number of data bases	177	208	259
Number of records (millions)	46	58	94
Other Developed Market Economies			
Number of data bases	124	154	269
Number of records (millions)	6	13	55
Total:			
Number of data bases	301	362	528
Number of records (millions)	52	71	148

ii) In many instances the challenge is perceived not due to United States government but more specifically from the multinational corporations, which have acquired supernational powers and are independent of any local governments control. The multinational corporations which are expected to account for 16-20% of the world output by 1985, are engaged in a substantial amount of transborder data traffic.

The concerns about transborder data flow vary from country to country. However, it is well documented in some reports commissioned and submitted in few countries namely France, Canada and Sweden. The French government has initiated a number of steps to ascertain the impact of data flow on French economy and citizens. The Norce-Minc Report of "L' Information de la societe"[5] submitted to the French Government in June 1978 is a comprehensive catalogue of French concern about the role of United States in computing, data processing and telecommunications. The report makes the following points.

i) the "information of society" will have serious social, economic and cultural consequences for France;

ii) foreign firms (primarily IBM) must not be allowed to be instruments of foreign (primarily United States) dominance;

iii) Post, Telephone and Telegraph Administration should be restructured so that telecommunication can be redirected to work more closely with other high technology agencies;

iv) mastery of component technology is as important as nuclear mastery for national independence;

The above report represents a serious French commitment to retain or achieve control over the future information industry. The French Government prodded by the Norce-Minc report is also now considering alliances with other European administrations in the area of telecommunications, computers and electronics to combat American companies. In addition, the Government has set up a special commission on "Transborder data flow" in 1979 to report directly to the President of the Republic.

For the last ten years the Canadian Government has also been trying to establish and maintain an information-communication policy. As a result, a number of government reports have been produced in this area. The report entitled "Telecommunication and Canada"[6] popularly known as "Clyne Report" submitted in

1979 in particular considers the implications of transborder data flows for Canadian sovereignity. According to this report Canada is increasingly reliant on foreign (primarily United States) computing services. It stresses the need to avoid the dependence and reliance on American technology. The report suggests that the only alternative solution lies in the cooperative development of a national strategy to protect Canadian interests and derive the greatest benefit from the development and use of informatic technology available in Canada. To this end the Committee made two recommendations:-

i) The Federal Government, in agreement with the governments of its provinces and the private sector, should stimulate the development of plans for the creation of Canadian-owned private data banks, as well as other similar agencies funded by government aid and other incentives should be devised for that purpose;

ii) the government should act immediately to regulate transborder data flows to ensure that we do not loose control of information, vital to the maintenance of national sovereignity.

The report concluded that Communication technologies are developing so rapidly which poses threat to Canadian soverignity in both its cultural and commercial aspects.

In Sweden the "Committee on the Vulnerability of Computer Systems"[7] which was set up by the Ministry of Defence at the behest of the Cabinet, under-scored several political, legal and economic problems, resulting from extensive computer use and foreign data flow. It stated that "vulnerability" is due to several factors: chief among them are dependence on foreign sources; and manpower dependence. The main cause of present vulnerability is that there has been no governmental control over the development which has led to the highly computerised society of today. There has been no overall assessment of the risks entailed in the entire field of civil sector, much less for the country as a whole. The lack of awareness of vulnerability problems is not unique in Sweden. There are several other countries both developed and developing, which have recently shown concern over the problems of transborder data flow. Some of these countries have been expressing these concerns at the various international forums, conferences and meeting, etc.

3. TYPE OF TRANSBORDER DATA FLOW

Before debating on the various issues and factors involved in transborder data flow, it will be worthwhile to know what type of data flow are actually involved. There are four types of data that are considered under this area. They are: operational data, financial data, personally identifiable data, and scientific and technical data. Operational data consists of those transborder data flows that support organisational decisions or that sustain certain administrative functions. In this area most of the international data flows normally consist of flows between subsidiaries and headquarters of multinational organisations (corporations, trade unions, and others). In such cases, data from subsidiaries are usually processed by the headquarters computing facility. Operational information maintains vital lines of communication between parent organisation and its subsidiaries. The firms that maintain operations in more than one country and depend upon data communication links to aggregate and to disperse management information may be particularly vulnerable to restrictions on data flow. Restricting the flow of operational information is, therefore, a strong measure that can directly influence economic activities. The second category of data involves actual financial operations that result in credits, debits and transfer of money. It is important to distinguish operational data containing financial information from those data that represent actual currency transactions. The free flow of financial data permits concurrent financial arrangements and flow of capital conversely. Restrictions on financial data flow can, however, inhibit trade substantially, with economic consequences. A third type of data flow transactions is that which contains a personally-identifiable information. This information may relate to credit, medical history, criminal record, employment, travel reservation or it may simply be a name or identification number. There is no accurate estimates of the proportion of personal data in international flows, but it is now recognised as being small, almost certainly less than 10 per cent. Although personal data is insignificant in the total volume, it has achieved widespread attention because it raises important issues which are different from those arising in other categories. The presence of personal information may require substantially different treatment due to the restrictions imposed in some states by legislations. A final type of data flow contains scientific and technical information. These data might include the results of experiments, surveys, environmental or meteorological measurements, etc. Bibliographical data bases and the scientific software to process raw data are also communicated to the multinational and scientific community by computer. Inclusive policies can promote scientific cooperation and assist in technology transfer, while exclusive policies deny these resources to various groups and nations [2,8].

3.1 *Volume of Data*

Although it is not possible to identify fairly well the type of data flowing internationally, very little estimate is yet available about its volume or the pattern of traffic. For the moment, there are only individual examples to quote. Societe Internationale de Telecommunication Aeronautique (S.I.T.A.) network carries some 100,000 million characters per year. There is also some world-wide figure including considerable volume of message-switched telegraph type traffic available. Such information as is available suggests that big networks have flows of the order of 10,000 to 100,000 million characters per year. A good many more have flows in the order of 1,000 to 10,000 million characters per year and below that level it is hard to justify the cost of even a single point-to-point international telephone line. In order to get a better idea about the volume and pattern of traffic the projected data communication study to be commissioned for the European PTT's by the Eurodata Foundation will go a long way.

5. ACTORS AND PARTICIPANTS IN TRANSBOARDER DATA FLOW

The major actors in transborder data flow are national governments, industry, international and inter-government organisations. Each actor has some ability to influence the flow of information. Each actor perceives benefits by pursuing either exclusive or inclusive policies over the access, control and use of transborder data flow. Competition between the exclusive interests of information control and the inclusive interests of unrestricted transfer of information accross national boundaries is the centre of controversy of the transborder flow debate. Inclusive interests represents the free flow of information. They want to promote increased sharing , use and exchange of transborder data flows. Exclusive interests on the other hand represents "Sovereignity over information". They want to promote controlled use and restricted access.

4.1 *National Governments*

The national governments are and will remain the most significant actors in transborder data flows. They take various roles in addressing the problems raised by transborder data flows: that of the governing policy-making authority; that of a user of information resources in each country; and that of supplier in most countries, of telecommunication facilities.

Major transborder data flow policy issues must be addressed at the governmental level. No fully adequate tradition for dealing with these matters exists, and yet there is a growing awareness of their importance. The broadest aspect of government involvement, then, is that of policy-making authority, with a wide variety of concerns of a political, economic, social and cultural nature.

The government has been the largest user of information resource including computing, data processing, telecommunication facilities and services. Usually the single largest customer for these resources, the government is and should be concerned primarily with cost availability, reliability and other ordinary commercial incidents of market place.

The national government, as a supplier, complicate matters even more, with the telecommunication being a government monopoly in most countries (The United States being the Chief exception). Historically, the Post, Telephone and Telegraph Administrators (PTT's) have led the classical life of the protected monopolist who can ignore market considerations and especially customer preferences more or less at will. In recent years there has been growing tension between many PTT's and their larger customers, often multinationals, who use modern electronics to configure on a cost effective basis the raw circuits provided to them by the PTT's. Private line circuits or communication channels dedicated to a particular customer have been the backbone of most international data networks[9].

4.2 *Industry*

There are various categories of actors involved in this section. In the first category falls the suppliers of goods and services used in the information field such as computer manufacturers, software suppliers, providers of data base services, and terminal equipment manufacturers. The second category consists of primary commercial users of such services namely multinational enterprises, commercial airlines, direct mailing companies, credit firms, energy suppliers, and manufacturers. The multinational corporations play the key role. They are both principal suppliers of necessary infrastructure and users of infrastructure, be it for corporate management purposes or for the provision of international data processing and information retrieval services. In fact corporate transborder flow takes either through intercorporate channels or among corporations in closed user-group networks.

The third category of actors are some of the enterprises which own and operate communication facilities. There are number of private communication carriers and international data network organisations. Various communications carriers are permitted to transfer computer-related data through international networks. Examples of this category are RCA Global Communications, ITT World Communications, and Western Union International which offer such services to selected countries. Transmission rates and realiability both tend to be lower through these carriers. Therefore, these services are not widely used. As far as international data network organisations are concerned, they are normally owned and operated by a group of subscribers for some common usage. Examples in this category can be of S.W.I.F.T. (Society for Worldwide Interbank Financial Telecommunication) an International banking network and the S.I.T.A. (Societe Internationale de Telecommunications Aeronautique), an international airlines network. The previous banking network is owned and operated by a consortium of banks. It links nearly 600 banking organisations with close to 1000 branches in 17 countries of Europe, Canada and Brussels and Amsterdam and carries 120,000 messages daily for customers: tariff transfer, bank transfer, foreign exchange, interest payment, deposits, confirmation of debits and credits, and other statements.

The fourth category of actors are enterprises known under the label of "Data Processing Bureaus". They provide data processing, storage and retrieval services. Examples in this category are COMSHARE, CYBERNET, INFONET, MARK-III, TYMSHARE (The parent corporation of TYMNET). These bureau offer their powerful and highly sophisticated hardware for two major types of services: time shared data processing and data-base information retrieval. In addition, they provide complex software package which are often directed to highly sophisticated needs, and frequently allow access to large data bases. Since these services are offered on a cost-shared basis and with all the necessary in-house expertise and support capabilities, many organisations find them cheaper than to maintain their own computer and telecommunication capabilities.

In the fifth category falls those enterprises, which combine both the functions of private data networks and data processing services bureaus. They have recently emerged and popularly known as value-added networks. Such networks serve two functions: that of leasing communication lines from other communication carriers and adding enhanced data transmission capabilities dedicated to data transmission for processing, storage and retrieval purposes. Such networks operate both on a regional level such as EURONET as well as in international framework such as TELENET and TYMNET. The last two are so far the only publicly accessible intercontinental networks that exist today. A number of such network services are planned for 1980's also. They include Satellite Business Systems (SBS) and Xerox Telecommunication Networks. American Telephone and Telegraph Company (A.T. & T.) has also plans for an advanced communication services to compete with these new data networks.

4.3 *International & Inter-Governmental Organisations*

These category of organisations play a significant role in transborder data flow debate. Their, actual use of computer communication is probably quite small; however, these organisations provide an arena both for controlling data communication technology and for debating and resolving conflicts about the transborder data flow directly as well as indirectly.

One of the main inter-governmental organisations in this area is International Telecommunication Union (I.T.U.), a specialised agency of the United Nations. Although the I.T.U. operates no communication facilities yet its planning, standard setting and coordination functions extend to telephone, telegraph, broadcasting and data communication. Most of the permanent work of the I.T.U. is performed through its International Telegraph and Telephone Consultative Committee (C.C.I.T.T.), and the International Radio Consultative Committee (C.C.I.R.). Administrative conferences held under I.T.U. sponsorship have considerable authority to establish important international practices, such as the allocation of radio spectrum frequencies, etc.

The I.T.U. has not directly addressed transborder data flows issues but has dealt increasingly with setting standards and tariff principles for international data networks. There are also a number of regional telecommunication organisations such as the Conference Europeenne des Administrations des Postes et des Telecommunications and the Asia-Pacific Telecommunity, which attempt to coordinate the regional planning of facilities and to promote other cooperative activities. One international organisation also serves as a carrier of international telecommunication traffic and operates its own system of communication satellites. It is the International Telecommunication Satellite Organisation (I.N.T.E.L.S.A.T.).

A number of similar other organisations which have been directly involved in the debate are: The Council of Europe, Organisation for Economic Cooperation and Development (OECD), The European Communities, the Inter-Governmental Bureau of Informatics (IBI), etc. The Council of Europe started the work on privacy aspects of the medical data of individuals in the early 1970's. In 1973 and 1974, the Committee of its Ministers adopted two resolutions concerning the privacy of individuals vis-a-vis electronic data banks in the private and public sectors respectively. The subsequent work of the Council in this area ended up in a treaty to deal with the broader issues of personal privacy. This treaty places obligations on data users and confers right of privacy on data subjects, and it allows a country with national privacy legislation to restrict data flow only to countries where no equivalent legislation exists. The O.E.C.D. interest in transborder data flow started as early as 1969 as a result of its report in 1971 on privacy protection. In July, 1974 it organised a seminar on policy issues on the protection of privacy. In order to obtain more evidence on the nature of problem, O.E.C.D. organised a broader seminar on the theme "Transborder Data Flows and the Protection of Privacy" in September, 1977 at Vienna which discussed the broader aspects, notably taking into account the recent development in data networks. Subsequent to the Vienna symposium, a new High Level Expert Group on Trnasborder data barriers was created in the early 1978. This group subsequently developed guidelines which are intended: to bridge between the privacy protection situation now developing in many European countries, and the one developing in non-European O.E.C.D. Member countries; and to create a more homogeneous international data regulation environment. The European Economic Community, primarily a geo-political organisation has mainly concentrated on economic and trade aspects of the question. It has carried out studies concerning the problems of harmonisation of national legislations within the community, the problems of data security and confidentiality, and the nature of transborder data flow. A Sub-Committee of the European Parliament held a public hearing on data processing and the right of individuals in early 1978. Its work has resulted in placing to the European Parliament in spring 1979 a report which was subsequently adopted by it in spring 1979. Subsequent work of the community has given some consideration to the drafting of a Directive to create a community for the exchange of data among countries. The International Bureau of Informatics (I.B.I.) an European and Third World Trade oriented group, has also considered transborder data flows, though largely in the context of Third World concerns.

The United Nations has been indirectly concerned in transborder data through its "Committee on Peaceful Uses of Outer Space". However, UNESCO has shown concern in this question which has been mainly concentrated on mass media aspects of transborder flow. Its recent Mc Bridge Commission Report, has, however, dealt with data question.[1] This report calls for an assessment of overall traffic structure of the international data transmission that presently discriminates against developing countries. It advocates better access to satellite collected data on earth resources, crop growth, ore deposits to developing countries from developed countries. There are other organisations also, which have from time to time dealt with these questions, namely, Nordic Council and various non-governmental organisations such as the International Federation for Information Processing (IFIP), Inter-governmental Council of Automated Data Processing (ICA), etc.

5. BROADER ISSUES INVOLVED

5.1 There has been growing public concern, especially on the international transmission of personal data. These public fears have persuaded many governments that special legislation is required to regulate the use of personalised data. Of the OECD member countries, more than one-third have so far enacted one or more laws, which among others are intended to protect individuals against abuse of data relating to them and to give them the right of access to data with a view to checking their accuracy and appropriations. In the federal states laws of this kind may be found both at the national and at the state or provincial level. Such laws are referred to differently in different countries. Thus, it is common practice in continental Europe to talk about "data laws" or "data protection laws" whereas in English speaking countries they are usually known as "privacy protection laws". The debate about data flows goes further than privacy. Countries are often worried that they are sending too much information to foreign nations for processing or that they rely too much on outside countries for other computer services. Therefore, they may on purely technical grounds use their privacy laws to restrict the movement of data.

In the United States there are many privacy acts at the national, state, and local level and considerable attention is paid to the private issues within the private sector. The U.S. States have drawn these laws without referring to data processing as such: privacy protection is regarded in the United States as the civil and human rights issue not one of economic and industrial regulation. The U.S. policy on the personal privacy aspects of transborder data flow is built around the notion of free flow of information and the desirability of maintaining that free flow so far as possible and so far it is compatible with other human rights.

A number of countries namely: Sweden (1979), West Germany (1977), Denmark (1978), Norway (1978), France (1978), Austria (1978), Luxembourg (1979) besdies Australia, Canada and New Zealand, have enacted laws in this direction. These laws have a number of common features. Nearly all of them place restrictions on the export of personal data and usually demand the existance of comparable law in the recipient country. These are limitations on the length of time data can be stored, and regulations on secondary use, sharing and dissemination of data. There are remarkable differences in the United States and European laws which are:-

i) Europe has chosen the "Omnibus" approach: as comprehensive regime of public law. The U.S. has opted for a series of privacy laws that cover different subjects. Relevant laws concern: credit registration (1971), federal data banks (1974), and student records (1975);

ii) In European countries, the existing privacy laws cover the public as well as private sector, whereas in USA and Canada, mostly the public sector is subject to privacy legislation so far;

iii) Most European Governments have adopted some form of government machinery to monitor the implementation of their privacy protection legislation; in the USA on the other hand, no special federal agency or commission has been created;

iv) In USA, most of the privacy laws refer to physical persons only. However, recent laws passed by some countries in Europe cover legal entities i.e. such as multinational corporations. This enables a country to relate industrial, financial and commercial information as well as personal data. Norway, Austria, Denmark and Luxembourg have all extended their privacy laws to cover legal entities, while France succeeded to pressure from multinationals on this point and restricted the law to physical persons for the time being.

v) Additionally United States laws apply only to its country's citizens while in Europe, reciprocal agreements among nations provide protection for the citizens of all participating countries. This assymetry could prevent the United States from obtaining information from foreign countries.

Some limited progress has been made in developing guidelines to coordinate conflicting national legislation. The OECD has set up such guidelines, but they are voluntary, and several countries are reluctant to enter into the agreement. The guidelines attempt to reconcile some basic differences between United States and most European Nations. Outside the OECD, the Europeans have adopted a binding treaty within the Council of Europe. The treaty placed obligation on data users and confers right of privacy on data subjects and it allows a country with national privacy legislation to restrict data flow only to countries where no equivalent legislation exist[10,11].

Although privacy laws have been widely discussed over the last few years, but the international transmission of personal data is very small except in banking, credit control, travel application, etc. It is generally observed that a great deal more transborder traffic relates to sensitive corporate information. This data is as sensitive as personal data. Transborder data flows restrictions are not limited to industrial nations alone. Increasingly, less developed countries fearing "electronic colonization and electronic imperialism" have adopted the right to exercise the control over all information gathered within the borders of national-state. According to a recent survey of Inter-Governmental Bureau for Informatics (IBI) a number of developing countries have indicated their intension to regulate the transborder data flows. While considering individual countries, Brazil is the only developing country which has the most sophisticated legislation. Imports of computer and data services are closely scrutinised by the government and prior approval must accompany all export. It grants only temporary authorization for access to its information sources. It is also contemplating the creation of national register of data banks and applying tariffs on information services. In other developing countries namely Venezuala and Algeria, there is an embargo on the foreign movement of data related to oil production. Mexico has put a condition that their foreign flow of information of Mexico origin be subject to rules that regulate the circulation of information on grounds of national interest[12].

5.2 *National Interdependence, Sovereignity and Power*

The international transmission of information does lead to national interdependence in many situations. The advantages of using remote data processing facilities for sharing expensive facilities had led to situations where users in one country become dependent on the reliable operation of facilities in another. For example several national airlines use seat reservation systems belonging to and located in a foreign country (e.g. AIR IRAN uses the KLM computer in Amsterdam)

Another example of this type can be seen in the case of computerised banking system called S.W.I.F.T. (Society for World Financial Information Transactions). This system allows finance houses to buy and sell in world market and to make loans anywhere at any time. It means that money can be moved around the world with greater rapidity and without any physical or legal hindrance. S.W.I.F.T. handles 300,000 transactions at a time, some of considerable size beyond all national control. This system generates a kind of "stateless money" huling around the globe potentially creating international currency instability as it moves. In the hands of a hostile power, S.W.I.F.T. could be devasting tool. Besides increasing the velocity of international money and causing currency and stock fluctuations, such devices could create a kind of electronic "free port" where funds can be placed in unregulated market [2,13].

Fears have also been expressed that as national interdependence increases the activities of a country to control its own affairs will be reduced, thereby infringing on its sovereignity. Certainly the increasing influence of multinational companies in the trade and industry of many countries has resulted in data relevant to day-to-day functioning of a country being held outside its borders. If this data is withheld for some reasons then the industry and trade of the affected country may be put at risk. Furthermore, if the multinationals hold vital data relating to the operations of the company in distant computers then the ability of a government to direct the operations of that multinational in its area of authority is reduced.

Also once the data is exported they often move outside the jurisdiction of domestic courts of law. Sometimes national sovereignity interest may compel disclosure of information contained in transborder data flows or may order denial of such flow. Data communication networks are vulnerable to interceptions and contents of their transmission can be disclosed to unauthorised parties. Valuable interlligence is gathered from monitoring such communications and surveillance is performed routinaly by countries who want to learn about the activities and groups in their own countries.

The misuse of data for political purposes constitute another important facet of national sovereignity. Threats of economic sanction may in future be an increasing common international means of pressure to attain political aim. If a country is highly dependent on imports of computer equipment and services, automated data processing (ADP) sector may become an attracted target of attack in different forms of economic warfare. Even a limited blockade against the import of spare parts would very quickly have serious affects.

Another spectacular example in this field is that of remote sensing by photo satellites. These satellites (spies in the sky) are used to survey the earth and its diverse features including agriculture, forest, ocean and mineral resources. A large amount of data is regularly collected about various countries through these satellites. At present, only few countries namely United States, Soviet Union, etc have the capability of making and launching remote sensing satellites on one hand and the processing electronically the data collected by these satellites on the other hand. The differential capacity to sense the earth and interpret the data has placed many countries at a serious disadvantage. On the basis of technological supremacy the United States has developed large data bases on the resources of developing countries. The United States launched the "LANDSAT Program", consisting of a series of satellites under the auspices of National

Aeronautical and Space Administration (NASA) in 1972 as a part of broader resource monitoring and assessment system. To-date the raw data secured from remote sensing has been made available by the United States government to other governments at a nominal cost. However, the processed data is handled quiet differently, normally treated as "proprietary information".

This form of data gathering through remote sensing poses two issues both affecting national sovereignity. First, there is a basic inviolabity of national space. Second, there is an unequal capability to use the data derived from remote sensing. As one report carefully notes "there is a little doubt that sophisticated institutions can use remote sensing technology to increase the economic and political power relative to less sophisticated institutions. Knowledge of likely oil deposits, projection of crop yields and better estimates of mineral concentration can help developed countries and their multinationals possessing remote sensing technology to make better political judgements, rewarding bids in international market and better bargaining position vis-a-vis developing countries". Consequently, we find that many multinational governments in satellite venture. An example of the category can be seen in the United States "Sterosat Spacecraft", to be funded jointly by the United States government and its petroleum and mineral multinationals. Also the growing usefulness or remote sensing technology has made the United States multinational coporations to push for shifting the LANDSAT System from under NASA to private ownership. The French too are seeking to enter the market for remotely sensed data. They have recently formed a company SPOT-IMAGE which will acquire, process and sell remotely sensed data. In the future a large number of companies are likely to enter in this field[14, 15].

5.3 *Economic Issues*

There are important claims that certain national policies in transborder data flow regulation have economic and trade under-currents. A clear idea of this economic under-currents can be had from a report entitled "Telecommunication and Canada" brought out in 1979 by Canadian Government. According to this report Canada is increasingly reliant on foreign, primarily United States computer services. When 400 Canadian subsidiaries of United States companies were approached it was found that in 1978 some $ 300-350 million dollars worth of computer services were imported from United States services headquarters, with an increase of about $ 15 million estimated by 1985. Further it was expected that as a result, about, 23,000 jobs in computer services will have been lost to the Canadian economy by that time. This has led to the potential of growing dependence than independence in the development and utilisation of advanced information technology, the loss of employment opportunities in addition to balance of payments possibilities.

The transfer of employment which result from foreign data processing is more than short term loss, it is contended. However, these threats to employment hit hard at a period when the countries have large number of people without jobs. They influence governments to either reduce foreign flows or impose taxes (VAT) or tarrifs (for lost domestic business) on enriched data which is processed and then returned to the originating country. Concerns alongwith these lines were also made by a number of countries. They think that setting up of an international information trade could disturb "balance of payments" in a way which would be difficult to handle, given that these exchanges do not appear in custom statistics. They mentioned the fact that information being intangible is not identified in trade statistics. Therefore, its economic dimensions are not measured by the major international organisation (World Bank, OECD, etc.). When more of the implication of the information economy, are known, new approaches to the taxation of domestic and foreign information services will become more clear. At present, however, many countires are still trying to decide how to tax software, magnetic tape, disc packs and cards[12].

5.4 *Social and Cultural Dimensions*

With regard to socio and cultural aspects, serious concern has been expressed about the potential of cultural domination from one country by another or from one region by another. This risk is perhaps greatly exaggerated since experience shows that opening up to the outside world is usually accompanied sooner or later by a substained determination to maintain one's own cultural values in the face of imported alternatives. It is, however, worth pointing out that "culture industries" from newspaper to music business, and even to banks of data are particularly obgopolitics and prone to domination by certain groups and values. The removal of barriers can therefore, lead to cultural imperialism which sometime-accompanied model of imported development. Even if we look within the narrow sense of transborder flows (ignoring TV, etc.) the use of foreign computer aided learning programmes and use of foreign videotex, home service may emphasise foreign products, values and cultures.

REFERENCES

[1] Seitz. Data communication and data processing - A basis for definition. Telecommunication Policy 1980, (March), 49p.

[2] Organization for Economic Cooperation and Development. The usage of international data networks in Europe. Paris, 1979.

[3] Hurtado, M E. Tug of war over computers. South 1978, (January), 28-29.

[4] Williams, M E. Data bases and on-line statistics for 1979. Journal of American Society of Information Science 1980, 7 (December), 27-29.

[5] Nora, S and Minc, A. Report on the computerisation of society. MIT Press, 1980.

[6] Canada, Department of Communications, Consultative Committee on the Implications of Telecommunications for Canadian Sovereignity. Telecommunication and Canada. Ottawa, 1978.

[7] Sweden, Ministry of Defence. The vulnerability of computerised society: considerations and proposals. December 1979.

[8] Novotny, E J. Transborder data flows and international law: a framework for policy oriented inquiry. Stanford Journal of International Law 1980, 15 (Summer), 181-200.

[9] Fishman, W L. Introduction to transborder data flows. Stanford Journal of International Law 1980, 15 (Summer), 1-26.

[10] Hondius, F W. Data law in Europe. Stanford Journal of International Law 1980, 15 (September), 87-112.

[11] Kuitenbrouwer, F. The World data war. New Scientist 1981, (3 September), 604-606.

[12] Pipe, Russell. Transnational data flows. Inter-Media 1979, 7(6), 12-16.

[13] The Stateless money. A new force in world economics. Business Week 1981, (21, August), 76-85.

[14] O'Brian, R.G. & Hellencir, G K. The political economy of information in a changing international economic order. International Organization 1980, 34(4),

[15] Schiller, H I. The transnational corporation and the international flow of information: Challenges of national sovereignity. Current Research on Peach and Violence 1979, 11(1), 1-11.

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TRENDS IN NUCLEAR RESEARCH AND ITS PUBLICATIONS -- AN ANALYSIS BASED ON FIVE YEARS COVERAGE IN THE INDIAN SCIENCE ABSTRACTS

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The analysis of Indian journals, covering Nuclear Physics literature received from different institutions based on 'Indian Science Abstracts. has been reported. The survey reveals that more than 50% of the literature is concentrated in four journals and one annual publication - 'Proceedings of the Nuclear Physics and Solid State Physics Symposium' which contains 23 per cent of the total articles. The institutes of higher learning and BARC are the main contributors. The trends of research and its publication in various journals propose the publication of a new journal to prevent the scattering of articles and also to channelize the contributions of the researchers in this subject area.

INTRODUCTION

The field of Nuclear Physics is ever advancing. To maintain this trend, the theoretical developments involving various processes of nuclear fission on the one hand and their applications by the use of powerful accelerators on the other hand, have to go side by side. In the present study, an attempt has been made to find out the research trends in this field. The source used for the study was the Indian Science Abstracts (ISA) - a national abstracting service covering Indian scientific and technical journals and other documents.

In a study made by Rangarajan and Gupta [1], based on the coverage of the Physics Abstracts (PA), it was observed that more than 50% of the articles by Indian authors in Nuclear Physics and other branches of Physics were being published in foreign journals. The periodical-wise analysis of this study indicates that not all the Indian journals in Physics were covered by the PA, (Table 3) during the period under study. One of the journals not covered by the PA contained the maximum number of articles (23%) compared to other journals.

METHODOLOGY

All the issues for five years (1975-79) of ISA were scanned for the purpose of the present study. All the entries given under UDC class numbers for theoretical and practical aspects of Nuclear Physics were included in the study. The details of class numbers along with the subject headings and distribution of number of articles under various subject headings are shown in Table 1. The information regarding author's name, author's affiliation, name of the journal along with the UDC class numbers were noted on 5" x 3" cards. The entries were arranged first journal wise and then institution wise. The results were recorded in a tabular form.

PUBLICATION-WISE ANALYSIS

Table 2 gives the list of periodicals and the number of articles contributed by each. The total of 1524 items were scattered in 64 periodicals, and some Conference Proceedings and Reports. The reports accounted for about 31% of the total entries. More than 50% of literature was covered in just 4 periodicals only which could be categorised as 'core' journals in the field. All of them are brought out by learned institutions/academies. They are, in descending order of productivity as follows:

1. Indian Journal of Pure & Applied Physics (Publications & Information Directorate of CSIR), New Delhi.
2. Indian Journal of Physics (Indian Association for Cultivation of Science), Calcutta.
3. Pramana (Indian Academy of Science, Indian Physics Association, and Indian National Science Academy), Bangalore, and
4. Current Science (Current Science Association and Indian Institute of Science), Bangalore.

The rest of the literature (18%) scattered in 52 journals which included journals brought out by some research institutions, private and government institutions and some universities. No standard or patent in the field was noticed during the period of study i.e. 1975-79. However 23 theses were noticed, which were from 3 universities, viz. Andhra, Surat and Baroda and one from IIT, Bombay.

INSTITUTION-WISE ANALYSIS

Almost all types of institutions like universities, IIT's, research institutions like Bhabha Atomic Research Centre (BARC), Saha Institute of Nuclear Physics (SINP), Physical Research Laboratory (PRL) and government institutes etc. have contributed to the literature in the field. The share of the contributions of some of the main institutions are given in Table 4. It can be seen that the maximum number of contributions came from universities followed by colleges, BARC etc. The details of the distribution of papers subject-wise for ten universities and colleges are listed in Table 5 and 6 respectively. Similar details for other institutions are given in Table 7. The work done in foreign institutions and reported in Indian journals was also recroded. Table 8 gives the distribution of articles contributed from various countries in Indian journals. An article each was received from the 28 institutions located in 15 countries.

INFERENCES

From Table 2 it can be observed that maximum number of articles were published in Proceedings of Nuclear Physics & Solid State Physics Symposium - an annual publication being brought out regularly by the Department of Atomic Energy, Physics Advisory Committee, since 1957. This publication (covering the period under study along with other journals (See Table 3), as evidenced from the List of Journals Covered published by the PA. This also points out the comprehensiveness of the ISA especially in this field which has got considerable coverage in Indian periodicals and reports.

From Table 7 it is to be noted that the institutions at Sl. No.4, 7 and 8, which are bringing out the 'core' journals, mentioned earlier, have been accepting a significant volume of articles from different indstitutions implying their unbiased liberal editorial policy. Obviously, the universities and colleges are the main institutions sending their contributions to these 'core' journals.

As confirmed from the earlier studies made by Gupta et al[2], universities and colleges are the main centres of research. This may be due to provision of adequate funds, proper guidance, and perhaps also owing to the UGC policy regarding Ph.D. degree as a must for entering an academic career. The work output is mainly in theoretical field since applied work in Nuclear Physics demands expensive and sophisticated equipment which are not available to all the universities.

Table 9 gives an overview of subject-wise distribution of articles from various institutions at a glance. From this table, it is observed that contribution on purely practical aspects (Nuclear technology and Isotope applications) is almost negligible in case of universities and colleges. However, a few articles in Nuclear Reactions are contributed by them. Maximum coverage is in the field of Atomic and Molecular Physics. This may be due to the fact that, researchers are most inspired by the significant contributions of luminaries like Raman, Bhabha, Ramanna, etc. This, being one of the fundamental fields of physics, a sizeable number of universities have got facilities, in terms of equipment available, for carrying out research. In case of TIFR, as is evident, stress on purely theoretical aspects was expected. Looking into the number of articles from BARC, in the fields of Nuclear Reactions, Nuclear Technology & Isotope Applications one concludes that BARC is the premier contributor in these fields. SINP seems to be the only institution where almost equal weightage is given to all the subfields of Nuclear Physics. Regarding PRL, CSIR and IIT's etc. no definite trend can be seen.

Although some 'planned' research, covering theoretical experimental and applied aspects, is going on in universities, colleges, BARC, TIFR etc., yet a perfect collaboration between these institutions and the others like CSIR, IIT, PRL (Ahmedabad) is yet to be achieved. This situation can be dealt with by creating a proper communication medium through which an effective exchange of views between the research workers working in different institutions may take place. A list of journals given in Table 2 which publish nuclear science literature also include articles from other branches of Physics in general. Editorial boards of such journals face various editorial problems when large number of articles in different fields are received for publication. One of the problems is unnecessary delay in publication of papers which is quite disappointing for the authors who want to claim priority of their work. Due to this problem of delay, authors generally send their papers for publication to foreign journals devoted to specialised branches of physics. Hence to streamline and check the scattering of articles and to further channelise the contributions from different institutions, it is suggested that a new journal specifically devoted to Nuclear Physics, preferably in two parts covering theoretical and experimental aspects, be started with the joint efforts of various research institutions. A successful effort has been made in this direction by some research institutions who have started a monthly journal 'Pramana'.

Work done in foreign institutions and reported in Indian journals (Table 8) indicates the vast scope of the field. The main contribution was in Atomic & Molecular Physics and Elementary Particles.

From the list of periodicals given in Table 2, it is seen that no patents and standards were included in five years span during which this study was made. The reason for this may be that in this field, some secret or confidential patents and standards are there, meant for limited circulation only.

RESULTS AND CONCLUSIONS

The large number of articles in Nuclear Physics now being published in various Indian periodicals (including proceedings, reports), from different agencies in India and abroad, require a proper medium, which necessitates the launching of a new specific Indian journal in the field. The need for it has been felt since long[3] and the observations recorded in this paper further support this view. The response of the various concerned institutions is encouraging in general. In case this is achieved, it may make the Indian authors, who frequently get their works published outside, to rethink and send their contributions to this 'new' journal.

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REFERENCES

[1] Rangarajan, K S and Gupta, B M. Analysis of Choice of Journals for Publication by Indian Physicists. J. Lib & Inf. Sci. 1979, 4(2), 144-61.

[2] Gupta, B M, Bose, P R, Rangarajan K S, Chandrasekaran S. Physics Research in India - bird's eye view. Physics News 1980, 11(2), 1-7.

[3] Guha B et al. Scattering of articles by Indian authors in foreign periodicals - a sample survey. Ann. Lib. Sci. Doc. 1965, 12, 76-86.

Table I

Subject-wise distribution of articles in Nuclear Physics covered in ISA (1975-1979)

UDC Cl.No	Subject Heading	No.of entries
539.1	Nuclear Physics in General	157
539.12	Elementary Particles	243
539.14	Nucleus. Nuclear Structure	163
539.16	Radioactive Decay	86
539.17	Nuclear Reactions	164
539.18/.19	Atomic and Molecular Physics	594
621.039	Nuclear Technology	75
621.039.8	Isotope Applications	42
	Total	1524

Table 2

Distribution of articles in various journals including Conference Proceedings, Reports

S.No	Name of the Journal	Entries
1.	Acta Ciencia Indica	26
2.	BARC Report	7
3.	Current Science	80
4.	Electrical India	8
5.	Indian Journal of Chemistry	10
6.	Indian Journal of Physics	224
7.	Indian Journal of Pure & Applied Physics	308
8.	Indian Journal of Radio & Space Physics	6
9.	Indian Journal of Radiology	4
10.	Indian Journal of Theoretical Physics	12
11.	Journal of Annamalai University	3
12.	Journal of Assam Science Society	3
13.	Journal of Electronics Engineering	7
14.	Journal of Indian Institute of Science	3
15.	Journal of Physics Education	6
16.	Journal of Scientific & Industrial Research	6
17.	Matscience Report	39
18.	National Academy of Science Letters	10
19.	Physics News	15
20.	Pramana	202
21.	Proceedings of Indian Academy of Sciences Sect-A	11
22.	Proceedings of Indian National Science Academy - Part A	15
23.	Proceedings of High Energy Physics Symposium, Jaipur	11
24.	Proceedings of National Symposium of Indian Isotopes, Radiography. Department of Atomic Energy, New Delhi	28
25.	Proceedings of Nuclear Physics and Solid State Physics Symposium, Bombay	354
26.	Proceedings of Symposium on Power Plant and Dynamics Control, BARC, Bombay	17
27.	Proceedings of Third High Energy Physics Symposium	12
28.	Science and Culture	4
29.	Urja	3
30.	Vignana Bharathi	4
31.	Others	63
32.	Thesis	23
	Total	1524

Table 3

List of Journals not included by the PA (During the period under study)

Sl.No.	Name of the Journal	Entries
1.	Indian Journal of Radiology	4
2.	Journal of Assam Science Society	3
3.	Journal of Electronics Engineering	7
4.	Journal of Physics Education	6
5.	Matscience Report (Institute of Mathematical Society, Madras)	39
6.	Physics News	15
7.	Proceedings of Nuclear Physics and Solid State Physics Symposium	354
	Total	428

Table 4

Distribution of articles from various institutions in descending order

S.No.	Institution	Entries
1.	Universities	717
2.	Affiliated and Engineering Colleges	184
3.	BARC	142
4.	TIFR	95
5.	IIT's	88
6.	IACS	53
7.	SINP	45
8.	PRL	34
9.	Foreign Institutions	28
10.	CSIR	23
11.	IIS	21
12.	Others	74
13.	Unidentified	20
	Total	1524

Table 5

Subject-wise distribution of articles in ten universities

S.No	Universities	539.1	539.12	539.14	539.16	539.17	539.18/.19	621.039	621.039.8	Total
1.	Andhra	25	10	10	20	5	21	-	-	91
2.	Lucknow	2	3	10	-	-	27	-	-	42
3.	BHU	5	3	4	1	4	20	-	-	37
4.	Punjabi	10	1	10	3	1	7	-	-	32
5.	Gorakhpur	-	-	-	-	-	30	-	-	30
6.	Allahabad	4	-	-	-	2	21	-	-	27
7.	Panjab	1	7	8	7	-	3	-	-	26
8.	Osmania	1	1	-	-	1	20	-	-	23
9.	Meerut	1	-	-	-	2	19	-	-	22
10.	Calcutta	-	3	3	5	-	9	-	-	20
	Total									350

Table 6

Subject-wise distribution of articles in ten colleges

S.No	Colleges	539.1	539.12	539.14	539.16	539.17	539.18/.19	621.039	621.039.8	Total
1.	Meerut	-	-	-	-	-	14	-	-	14
2.	Presidency College, Madras	-	-	-	-	-	12	-	-	12
3.	Gaya College	-	6	-	-	1	-	5	-	12
4.	Regional Engineering College, Rourkela	-	2	-	3	1	4	-	-	10
5.	Univ.College of Science, Calcutta	3	1	1	3	-	1	-	-	9
6.	L.S.College Muzzarfurpur	-	-	-	1	-	7	-	-	8
7.	Regional College of Education, Bhubaneswar	-	1	-	-	1	3	-	-	5
8.	Post Graduate College, Anantapur	-	-	-	-	-	5	-	-	5
9.	Presidency College, Calcutta	1	-	1	-	-	2	-	-	4
10.	S.V.College Aligarh	-	1	2	-	1	-	-	-	4
	Total									83

Table 7

Subject distribution of articles in various institutions (other than universities & colleges)

S.No	Institutions	539.1	539.12	539.14	539.16	539.17	539.18/.19	621.039	621.039.8	Total
1.	BARC	14	14	10	3	51	7	25	18	142
2.	TIFR	10	47	7	6	12	12	-	1	95
3.	IIT's	11	20	6	2	8	34	6	1	88
4.	IACS	2	11	1	1	6	32	-	-	53
5.	SINP	5	4	8	7	9	7	5	-	45
6.	PRL	-	4	15	3	2	8	-	2	34
7.	CSIR	-	1	1	-	-	12	5	11	23
8.	IIS	6	2	3	-	-	9	1	-	21
	Total									501

Table 8a

Contribution of foreign institutions published in India

S.No.	Country	No.of articles
1.	Argentina	1
2.	Bangla Desh	2
3.	Egypt	4
4.	France	1
5.	Germany	2
6.	Ghana	1
7.	Japan	1
8.	Lebanon	1
9.	Libya	1
10.	Romania	1
11.	Sri Lanka	1
12.	Taiwan	1
13.	Tanzania	1
14.	U.K.	3
15.	U.S.A.	7
	Total	28

Table 8b

Subject-wise distribution

539.1	539.12	539.14	539.16	539.17	539.18/.19	621.039	621.039.8	Total
1	8	4	-	3	11	1	-	28

Table 9

Subject-wise distribution of no.of articles from various institutions at a glance

Class No.	Univer-sities	Colle-ges	BARC	TIFR	IIT	IACS	SINP	PRL	Foreign Insti-tutions	CSIR	IIS
539.1	94	9	14	10	11	2	5	-	1	-	6
539.12	100	21	14	47	20	11	4	4	8	1	2
539.14	84	19	10	7	6	1	8	15	4	1	3
539.16	49	9	3	6	2	1	7	3	-	-	-
539.17	47	10	51	12	8	6	9	2	3	-	-
539.18/.19	335	110	7	12	34	32	7	8	11	12	9
621.039	5	6	25	-	6	-	5	-	1	5	1
621.039.8	3	-	18	1	1	-	-	2	-	4	1
Total	717	184	142	95	88	53	45	34	28	23	21

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EARTH SCIENCE DATA ACTIVITIES IN INDIA

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Some Indian agencies engaged in the field of earth science are developing computer-aided data bases. While discussing their activities, emphasis has been given on the need of proper coordination and standardization.

1. INTRODUCTION

Earth science tries to reconstruct events of the past from the imperfect and limited records contained in rocks. It also helps us to predict such hazards as earthquakes, landslides, high floods, volcanic eruption, etc., for which better knowledge of geological phenomena is required. Earth science also has very important economic aspects. We depend on it for all our mineral resources including ground water and energy. Minerals play a vital role in industrialization and national economy.

The recent developments in the generation, collection and analysis of earth science data calls for the acquisition of greater volumes of information than were required and readily recordable previously. In order to assimilate these necessary data, computers have been employed for storage, retrieval and analysis as an essential preliminary step to data interpretation.

2. INTERNATIONAL COORDINATION

Some international organisations are actively associated with the problems of earth science data activities and provide guidelines, standards and advice wherever possible.

a) The Committee on Data for Science and Technology (CODATA) has a Geoscience Advisory Committee. The role of the Committee may be summarised as follows:

- Development of a general programme for CODATA activities in the geosciences, mainly at the national level.
- Coordination of application and evaluation of selected information, particularly computer computer - related technology.
- Arrangement of special CODATA workshops, seminars and short-term consultations in response to evaluated data.

b) The Committee on Storage, Automatic Processing and Retrieval of Geological Data (COGEODATA), a specialist group of International Union of Geological Sciences (IUGS) is responsible for fulfilling the following objectives;

- To assess computer-oriented information technology and to promote its worldwide application to the management and interpretation of geological data.
- To facilitate the collection, compilation and communication of computer processable geological data.
- To promote general awareness of data and other information resources in geology, and
- To provide advice and training assistance within the scope of COGEODATA'S objectives and activities.

The scientific work of COGEODATA is largely done by following Working Groups and Task Groups:

i) Working Group on Selection and Capture of Geological Data.

ii) Working Group of Data Structure and Data Management.

iii) Working Group on Data Display.

iv) Working Group on the Application of Remotely Sensed Data.

v) Working Group on the Communication of Geological Data.

vi) Task Group on Exchange of Geochemical Data.

vii) Task Group on Retrospective Data Bases in Petrology.

viii) Working Group on a World Index of Geological Data Sources.

ix) Working Group on Educational Activities.

India is a member of COGEODATA and actively participating in its programmes and projects.

c) International Geological Correlation Programme (IGCP) Project 98 has made grate strides forward in the more specialised area of resource analysis. The project looked into the use of computer in resource studies and issued guidelines for the establishment of energy and mineral resource databases. It also examined several resource analysis techniques and has made recommendations as to when and how to use each technique.

With the help of these and other publications, many Indian organisations in the field of earth science committed themselves to store some or all of their geological data in some form of machine readable database.

3. EARTH SCIENCE ACTIVITY IN INDIA

Systematic geological activities started in India with the formation of the Geological Survey of India in 1851. The scope and objectives of the Survey in the formative years were limited to prospecting for minerals for the then East India Company. The Survey progressively enlarged its activities to cover many fundamental and several other applied objectives. Now the Survey has covered all aspects of earth science, i.e. geophysical and geochemical surveys, geotechnical investigations, environmental studies, mineral exploration, geohydrological and glaciological investigations, marine geology, photogeology and remote sensing, geochronology, fundamental and applied research, etc.

With the attainment of Independence in 1947, the Union Government recognised the need for proper assessment and exploration of the mineral raw materials to implement the national policy of development of basic industries. Till independence the GSI was the prime organisation engaged in earth science activities in India.

The growth of activities in different fields of earth science, necessitated the establishment of separate organisations to carry out specialised aspects of work. The following organisations have come into beging because of this necessity: the Indian Bureau of Mines (IBM), Oil and Natural Gas Commission (ONGC), Central Ground Water Board (CGWB), Mineral Exploration Corporation Ltd. (MECL), Coal India Ltd. (CIL), National Geophysical Research Institute (NGRI), National Institute of Oceanography (NIO), Indian Institute of Geomagnetism etc. Besides these, the State Departments of Geology, Geology Departments of universities, IIT's, and other government bodies, public sector organisations, autonomous/private institutions, societies/associations are also actively working in the field.

Thus the proliferation of earth science organisations after independence have been generating huge data which calls for proper collection, analysis, interpretation and dissemination to individual scientists, decision makers, planners, entrepreneurs, etc. in a convenient form.

4. IMPORTANT INDIAN ORGANISATIONS ON EARTH SCIENCE DATA

41. *Geological Survey of India, Calcutta (1851)*

The activity of the Survey covers all aspects of earth science. The huge volume of data collected during field and laboratory investigations is recorded in unpublished reports and the analysis and interpretation of the data is presented through various series of GSI publications. These data can be broadly catagorised as follows:

- Data on geophysics
- Data on geochemistry
- Data on petrology
- Data on marine geology
- Data on engineering geology
- Data on environmental geology & geomorphology
- Data on glaciology & geohydrology
- Data on stratigraphy & palaeontology
- Data on structural geology & tectonics
- Data on mineral investigations
- Data on geochronology and isotope geology
- Data on photogeology and remote sensing
- Data on mineral physics
- Data on geothermal energy

A Data Coding & Retrieval Unit was set up to design and develop computer-based data retrieval system in collaboration with the National Informatics Centre (NIC) of the Electronics Commission.

The following data files are being developed:

- mineral investigation
- geophysical
- geotechnical
- marine geology
- coal
- resources survey & inventory
- manpower

The programme for the generation of computer files has been developed by the NIC on the HP - 1000 minicomputer. The system is under test operation to effect necessary modification.

42. *Indian Bureau of Mines, Nagpur (1948)*

It works for systematic development of mineral resources and conducts geological, mining, benefication and other related techno-economic field studies and applied research on mining - geological operations. It also engages in appraisal and exploration of mineral deposits including ore dressing investigations and analysis of ores and minerals.

It maintains data on the technical and economic aspects of mineral deposits:

- Mineral resources categorized according to reserve, grades, chemical composition, geology, nature of deposits, dimensions, and status of exploration
- Temporary closures of mines
- Production (quantity and value) of different minerals categorized according to grade
- Mineral production (quantity and values) by state and mineral for different sectors
- Categorization of mines according to production by mineral and sector.
- Stocks of different minerals at year end and by State and grade at various points such as mine head, rail head, port, etc.
- Data on mineral consumption
- Data on mineral based industries
- Directory of mining leases & licences
- Revenue from mining industry
- Market prices of minerals
- Metal production

The huge data collected are presented in decumentary form through various series of IBM publications.

- Indian Minerals Yearbook
- Quick Release to the Mineral Statistics of India (Monthly)
- Mineral Statistics of India (Half-yearly)
- Quarterly Bulletin : Mineral Stocks
- Foreign Trade in Minerals & Metals

- Index Number of Mineral Prices in India (1930-1980)
- Bulletin of Mineral Statistics & Information (Monthly)

In order to achieve the objective of providing easy and quick access to the large volume of data for compilation and dissemination, on efficient computer based data storage and retrieval system is being developed by IBM. The micro-processor system (mini-computer) comprises a CPU with 52 K bytes of memory and is served by 4 floppy drives, a Dot Matrix Printer, Visual Display Unit (VDU), and 2 offline data entry devices.

43. *Oil and Natural Gas Commission, Debra Dun (1956)*

The Commission is responsible for oil and natural gas exploration and has carried out geological surveys, geophysical sruveys, deep drilling and estimation of recoverable oil and gas and its production. It has accumulated vast amounts of data on various aspects of oil exploration in both offshore and onshore.

- Geophysical exploration data
- Data on well logging
- Data on core analysis
- Data on wettability studies of core
- Data on capillary pressure on core
- Data on geological and chemical aspects of wells
- Data on well production
- Data on petroleum and gas reserve estimation

To handle such huge and complex data, the ONGC has installed an IBM 370/145 computer with a core capacity of 512K and 4 disk drives and 6 tape drives. It also has a Honeywell - 400, a TIOPS and GEODATA computer. The Commission has been working to build a comprehensive Computerised Petroleum Data Bank (COPED) which will cover the following aspects:

- analysis of users needs
- designing of scientific and technical data files for storage and retrieval
- data collection and standardization
- developing codes for recording data
- creation, maintenance and updating data files
- data processing and analysis
- management information system
- documentation
- data dissemination

Data for 500 oil/gas wells is stored in magnetic tape for reservoir modelling studies. Honeywell-400 computer with a tape drive and 2K bytes memory is used to support the data activities. A software comprising about a dozen COBOL programs has been developed and tested successfully.

44. National Geophysical Research Institute, *Hyderabad (1962)*

The Institute carries out basic and applied research in exploration geophysics and investigates the earth's interior through seismic, geomagnetic, electric, geochemical and palaeogeophysical studies. It is also conducting airborne surveys.

It maintains data on different aspects of geophysics:

- Seismological data
- Acromagnetic data
- Geophysical prospecting data
- Rock mechanics data
- Gravity & isostasy data
- Geophysical instrumentation data

PDP-11/40 computer is used for meeting the computational requirements. It regularly brings out Bulletin Observatories Data.

45. National Institute of Oceanography, Panaji (1966)

It functions as the national oceanographic data centre and maintains data pertaining to the Indian Ocean. They are:

- Data on physical oceanography
- Data on chemical oceanography
- Data on biological oceanography
- Data on geological oceanography
- Data on oceanographic instrumentation

Cataloguing of data from various stations are transferred to the punch cards for storage and dissemination.

46. *Coal Mines Planning & Design Institute, Ranchi*

CMPDI is a subdivision of holding company, Coal India Limited which was set up in 1975 to organise the production of coal, long and medium - term planning, research, development, detailed engineering design, etc. in the areas of:

- Data on boreholes
- History sheet of drilling of boreholes
- Lithology of boreholes
- Assay data on samples
- Identifying optimum thickness of coal strata or the desired grade.

The CMPDI is setting up a big computer based geodata bank for coal and lignite deposits in the country. Four broad areas have been identified for application of computer-based geodata bank system. These are:

- retrieval of geological drilling, laboratory analysis and other data
- drawing of contour plots and geological cross-sections
- quality and reserve estimation of coal seams, and
- management information system

47. *Central Ground Water Board, Faridabad (1972)*

The Board carries out systematic hydrogeological survey, exploratory drilling and detailed water resources evaluation surveys through water balance projects in various parts of the country. It is also responsible for ground water development and management.

It maintains data related to geohydrology and groundwater:

- Observatory well data
- Soil data (for grain size, porosity, etc.)
- Water level data
- Geophysical data for ground water exploration
- Hydrochemical data
- Aquifer samples data

The data is recorded in Technical report, Basic data reports, Water supply report, Hydrogeological survey reports etc.

48. *Indian Institute of Geomagnetism, Bombay*

The Institute deals mainly with terrestrial magnetism and atmospheric electricity. The Institute has collected data from magnetic observatories all over the world:

- Terrestrial magnetic data
- Magnetic field data
- Aeronomy
- Atmospheric electricity data

The Institute has access to the computer facility at the Tata Institute of Fundamental Research. Punching and verification of data on cards are carried out at the Institute with IBM and ICL key-punch machines and a verifier.

5. NEED FOR COORDINATION

Mineral resources/reserves data are very much helpful to decision makers and planners to chalk out planning strategies for further exploration and exploitation of minerals, their conservation and optimal utilization, and export and import. The planners need a complete integrated picture of national mineral resources data.

At present a number of agencies are engaged in this field to collect and store data in their own coding format to build up some sort of data base for effective retrieval and dissemination of information. Now, the time is ripe to evolve a standard for data coding to achieve database compatibility and the ability to exchange data among the agencies.

The Natural Resources Division of the Department of Science and Technology has formed a working group for coordinating mineral resource data bases in our country. The ultimate aim is to coordinate data bases maintained by different agencies under the mineral resource sub-system of NISSAT.

REFERENCES

[1] Baxter, G S and Horder, M F: Databanks and databases in geology. Journal of Geological Society 1981. 138(5), 573-74.

[2] Cargill, S M and Clark, A L: Standards for computer applications in resources; conference held as part of IGCP project 98, Kenya, 1977. Journal of the International Association of Mathematical Geology 1978, 10, 405-642.

[3] Clerk, A L and Cook, J L: International resource data - International resource analysis. In Geoscience Information - a state of the art review. Proceedings of the International Conference on Geological Information 1st, London, 1978. Broadoak Press, Sussex, 1978, 107-126.

[4] COGEODATA Newsletter.

[5] Kapoor, S K and Nag, D K: Geoscience data storage and retrieval system in GSI. In IASLIC Conference, 13th, Waltair, 1981, 61-64.

[6] Sastri, V V: Towards establishment of a computerised petroleum data bank (COPED) of the Oil and Natural Gas Commission of India. Library Science with a Slant to Documentation 1978, 15(1), 24-38.

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SOME INVESTIGATIONS ON RESOURCE SHARING ON CHEMISTRY JOURNALS FOR THE UNIVERSITY LIBRARIES OF PUNJAB, HARYANA, HIMACHAL PRADESH AND CHANDIGARH

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The number of duplicate chemistry periodical titles in the university libraries of Punjab, Haryana, Himachal Pradesh and Chandigarh is highlighted. Calculates the wastage due to duplication in terms of finance. Highlights the role of resource sharing in journal collection building. Prepares a ranked list of journals on the basis of citation analysis of the Journal of the Indian Chemical Society for the year 1979 and according to the number of universities subscribing to a particular journal. Includes some proposals for the subscription of chemistry journals, keeping in view the idea of resource sharing.

INTRODUCTION

A survey of information needs, habits, problems and awareness of botanists at Panjab University, Chandigarh; Panjab Agricultural University, Ludhiana; and Birbal Sahni Institute of Paleontology, Lucknow has revealed that journals constitute 70 per cent of total reading material consulted by them[1]. Citation analysis of different issues of the Journal of the Indian Chemical Society pertaining to the year 1979 has led to the conclusion that 88.56 per cent of the total citations are that of journal literature[2]. The increasing recognition of this vehicle of information transfer has directly influenced the growth rate of the journals. Several secondary sources like indexes, abstracts, bibliographies and other reference works are also being published in the periodical form. The number of titles has been increasing approximately ten times every fifty years. The number of such titles which at the beginning of nineteenth century was just 100 has, for example, gone to 1000, 10000 and 100000 in 1850, 1900 and 1960 respectively.

INSTITUTIONS INVESTIGATED

The investigations pertain to 8 universities in the states of Punjab, Haryana, Himachal Pradesh and the Union Territory of Chandigarh. These universities were established between 1947 and 1976. Panjab University (PU) Chandigarh is the oldest one. Two of its regional centres at Simla and Rohtak have been converted into Himachal Pradesh (HPU) and Maharishi Dayanand (MDU) universities in 1970 and 1976 respectively. Kurukshetra University, (KU) Kurukshetra; Punjabi University, (Pbi.U) Patiala and Guru Nanak Dev University, (GNDU) Amritsar established in 1956, 1962 and 1969 respectively are also multi-faculty universities. Punjab Agricultural University, (PAU) Ludhiana had its regional centre at Hissar which has been developed into Haryana Agriculture University (HAU) in 1970 after the creation of Haryana as an independent state. The present study dilates on the extent of wastage of resources in terms of finances and duplication of current chemistry periodicals in these universities located in the North-West region of India. Chemistry has been chosen for the present sample survey because along with its allied disciplines, it is the subject of teaching and research in all the institutions under investigation. Current periodicals subscription lists of these institutions for the year 1980-81 were obtained from the concerned libraries and analysed.

RESULTS OF THE STUDY

All these universities put together are subscribing to as many as 408 titles (Table 2) at a total cost of Rs.1,021,906.86, yet each one of these is getting only a few journals (about 30-37) out of nearly 12000 titles covering chemical literature published all over the world. HPU Simla subscribes to maximum number of chemistry journals (77) and it purchases only one part of the Chemical Abstracts, the most costly abstracting service, unlike the other Universities in this region. HAU Hissar gets the minimum number of chemistry journals (Table 2). All these universitities acquire chemistry journals primarily through subscription.

What is received through exchange of their own research periodicals is negligible. It is significant that the number of different titles as per Table 4 is only 149. There is a lot of wastage of resources in terms of finances because of avoidable duplication of chemistry journals in these universities (Table 3).

PATTERN OF JOURNALS SUBSCRIPTION

The indigenous communication channels viz; learned periodicals published in India, proceedings of conferences, transaction of societies etc. contribute only a very small fraction of the information sustenance of researchers. Thus, an Indian university library which feeds an ever-increasing number of researchers can afford to buy only a few journals because acquisition of journals entails provision of foreign exchange which is proverbially scarce in any emergent country. The prices of primary journals as well as secondary information sources have gone up considerably during the past decade or so (Table 1 and Fig. 2). Besides the inflationary trends, the budgetary cuts create a major problem. The universities are in a perpetual dilemma -- whether to continue the journals already being subscribed to or substitute them by new ones. The increasing number of serial titles therefore demands judicious selection and careful observation of subject content keeping in view the information needs of scientists.

DUPLICATION ESTIMATED AND REVIEWED

A discernible pattern in all subscription lists of periodicals in the universities under study is that most of the journals subscribed to are common. One of the reasons for this is that the comparatively newer universities have come up in the same region out of the extensions of old universities and carried with them a lot of individuals, traditions, habits and academic pursuits from the parent universities. These libraries largely duplicate the journals without caring to know whether the same title is available in a nearby library or not (Table 3). This dissipation of resources in acquisition and collection building is a cause for concern particularly in view of the fact that a few of the journals have to be dropped every year due to financial difficulties.

PU Chandigarh and GNDU Amritsar have as many as 40 common titles, the cost of which is greater than the total Chemistry journals budget of some universities. Even PU Chandigarh and Pbi.U Patiala duplicate chemistry journals worth more than a lakh of rupees though both the universities are situated just at a distance of 68 kms. In Chandigarh itself, 4 institutions are subscribing to Chemical Abstracts, whereas only one copy can very conveniently serve the purpose. HAU Hissar and PAU also have a lot of duplication (Table 3).

It is only Journal of the Chemical Society which is being subscribed by all the university libraries. Seven journals are common in 7 universities while 10 identical publications are purchased by 5 of these libraries. Fourteen, six and twenty seven research journals are common in 4,3, and 2 libraries respectively. The remaining 86 journals are purchased by different libraries (Table 4).

Out of the 408 titles subscribed by all these universities, 362 are foreign and 46 Indian. The amount being spent on subscription to Indian journals is negligible as compared to that of foreign journals (Table 2). Pbi.U Patiala does not subscribe to any Indian journal on chemistry. Certain universities do not even subscribe to important Indian journals like journal of the Indian Chemical Society which is the most cited Indian title in this country. Furthermore, the subscription prices of Indian journals are very low as compared to those of foreign journals (Table 2). India is thus acquiring information from foreign countries at a very high cost and communicating her results to other countries at a relatively much lower rate.

A perusal of the subscription lists of various universities also reveals that there is very little emphasis on publication in languages other than English (Table 4). There is thus little direct interaction between our scientists and those reporting their work in Russian, German, French, Spanish, Japanese, etc. probably due to lack of documentation services and translation facilities.

An analysis of the citations in the Journal of the Indian Chemical Society, 1979 was undertaken to find out the extent of utilisation of resources in our country because most of the research reported through this journal is by Indian scientists only. If the citation count of a journal is any measure of its utility, then there are only a few journals which are consulted quite frequently (Table 5, Fig.3). A ranked list of the journals is prepared on the basis of citation analysis (Table 5) and the number of universities subscribing to a particular journal (Table 4). The ranked lists (Table 4 and 5) along with the user requests may be helpful in ranking the journals for subscription.

An equilibrium has to be maintained between the resources and the needs. Resource sharing appears to be the only solution. Indian libraries are no exception, even the most resourceful libraries like the Library of Congress, National Medical Library and National Agricultural Library, U.S.A. share their resources to develop journal collections[4].

If the resources are shared and inter-library loan system alongwith reprographic services is developed, then much larger number of journals can be obtained within the amount being spent by the various universities in this region. It will satisfy the needs of the users better. The authorities responsible for storage and communication of information should chalk out a plan to this effect. A few proposals for consideration in this direction are given below:

PROPOSALS

A list of journals to be subscribed may be prepared on the basis of user needs and comparative study of subscription lists of various libraries giving due consideration of latest citation studies in the subject. Each university in the region may subscribe to 10 core journals. For the subscription of the rest of the journals, the various libraries may pool their funds and subscription may be undertaken either by the central library and documentation centre or by the libraries of different universities keeping in view the specialization of faculty members and various research projects being carried out at different places. The latter will be in keeping with the policy of University Grants Commission(UGC) of developing different departments as specially aided centres for research in particular fields. Most of the university libraries already have a minimum basic infrastructure for providing certain required services. HPU Simla undertakes inter-library loan services whereas all the other seven universities have xeroxing facilities also in addition to this. Microfilm reader is available at PU Chandigarh and PAU Ludhiana. The latter has also microfilming camera, thermofax, flexowriter, electrostat copier and electric stencil cutting, offset printing and diazo-printing machines. However, none of these universities provide translation facilities at present.

The sharing of resources will not put the users to inconvenience. All these libraries are situated at places well connected with rail (except a rail link between Chandigarh and Ludhiana), as well as road, and have efficient transportation and communication systems. Chandigarh, Simla and Amritsar are even air-linked. Furthermore, most of the journals do not play significant role in the effective transfer of information as is clear from the fact that only 408 titles out of about 12000 abstracted in Chemical Abstracts have been cited in the references of the communications published in the various issues of Journal of the Indian Chemical Society for the year 1979. Out of this, only 64 journals have been cited more than 10 times and their citation count is 64.37 per cent of the total citations[5]. Therefore, the less frequently consulted journals may be procured on resource sharing basis only.

It is proposed that one of the universities may function as central agency for subscription of journals and their distribution. In the present case Panjab University, Chandigarh is in a better position because of having a better established Chemistry Department and Chemical Engineering, Biochemistry and Pharmacy departments in addition to a nearby Post-Graduate Institute of Medical Research. Proper documentation services should be provided to the participating universities who may in return allocate some funds to the central agency for this purpose.

Chemical Abstracts may be procured only at a place responsible for providing documentation services. Journals other than the core ones may be obtained in exchange of various university bulletins. INSDOC may be approached to extend its SDI service from CA Search database to certain university chemists on payment of some subscription fee.

In brief, by pooling together of resources and centralized acquisition, many problems in serial acquisition can be solved and better bargaining can be done with the subscription agencies.

REFERENCES

[1] Anand A.K. and Malhan, I.V. Survey of information needs, habits, problems and awareness of scientists at Botany Deptt. of Panjab University, Chandigarh; Panjab Agricultural University, Ludhiana and Birbal Sahni Institute of Paleontology, Lucknow, p.2 [Unpublished].

[2] Anand, A.K. Analysis of communications in Journal of the Indian Chemical Society, 1979. IASLIC Bulletin 1981, 26(1), 21.

[3] Rozsa, Gyorzy. Scientific information and society. Montan, The Hague, 1973, p.11.

[4] Malhan, I.V. Reference work, information sources and tools, p.418. [Unpublished].

[5] Anand, A.K. Op. cit., p.19.

Table 1: Price Trends of certain chemistry journals

Year	Price in dollars					
	Chemical abstracts	Journal of Chemical Education	Chemical Reviews	Inorganic Chemistry	Journal of the American Chemical Society	Carbon
1970	1467	8	23.5	31.5	49.5	62
1971	1467	8	43	39.5	49.5	62
1972	1923	8	43	59	49.5	62
1973	1927	8	43	59	49.5	62
1974	2427	8	43	59	49.5	62
1975	2445	9.5	43	76	125	80
1976	3045	9.5	43	102.5	125	90
1977	3067	12	55.5	104	127	96
1978	3777	23	64	124	151	116
1979	3777	23	64	153	124	123
1980	5120	30	72	169	197	154
1981	5120					

Table 2: Foreign and Indian chemistry journals being subscribed to by different universities along with their total subscription cost.

University	Distance from Chandigarh (km)	Journals being Subscribed			Subscription cost in Rs.		
		Total number	Foreign	Indian	Foreign Journals	Indian Journals	Total
PU Chandigarh	0	57	53	4	147181.21	575.00	147756.21
Pbi U. Patiala	68	33	33	0	117603.50	0.00	117603.50
PAU Ludhiana	102	64	58	6	157949.29	1849.83	159799.12
GNDU Amritsar	244	55	46	9	118023.00	500.00	118523.00
MDU Rohtak	204	63	54	9	143619.05	650.00	144269.05
HAU Hissar	317	29	22	7	86277.40	870.00	87147.40
KU Kurukshetra	110	30	28	2	99782.40	360.00	100142.40
HPU Simla	130	77	68	9	145956.18	710.00	146666.18
	Total	408	362	46	1016392.03	5514.83	1021906.86

Table 3: Duplication of journals (alongwith their cost) among different libraries

Libraries	Number of duplicate	Financial involvement in Rs.
1	2	3
P.U. Chandigarh - Pbi. U. Patiala	20	104250.00
P.U. Chandigarh - M.D.U. Rohtak	30	120408.40
P.U. Chandigarh - G.N.D.U.Amritsar	40	152196.00
P.U. Chandigarh - H.P.U. Simla	37	102974.80
P.U. Chandigarh - H.A.U. Hissar	19	68778.00
P.U. Chandigarh - P.A.U. Ludhiana	24	97178.80
M.U.U. Tohtak - Pbi. U. Patiala	22	104176.30
M.D.U. Rohtak - G.N.D.U. Amritsar	29	122984.70
M.D.U. Rohtak - H.P.U. Simla	33	116995.70
M.D.U. Rohtak - H.A.U. Hissar	18	71456.40
M.D.U. Rohtak - P.A.U. Ludhiana	23	86540.90
G.N.D.U. Amritsar - Pbi. U. Patiala	23	116830.30
G.N.D.U. Amritsar - H.P.U. Simla	36	93438.00
G.N.D.U. Amritsar - H.A.U. Hissar	19	69429.40

1	2	3
G.N.D.U. Amritsar - H.A.U. Ludhiana	31	117223.60
H.P.U. Simla - Pbi.U. Patiala	25	72523.25
H.P.U. Simla - H.A.U. Hissar	14	16562.40
H.P.U. Simla - P.A.U. Ludhiana	21	47803.40
H.A.U. Hissar - Pbi. U. Patiala	13	65177.00
H.A.U. Hissar - P.A.U. Ludhiana	15	74109.40
K.U. Kurukshetra - P.U. Chandigarh	20	80074.40
K.U. Kurukshetra - Pbi.U. Patiala	15	64464.00
K.U. Kurukshetra - M.D.U. Rohtak	19	66433.00
K.U. Kurukshetra - G.N.D.U. Amritsar	24	88168.00
K.U. Kurukshetra - H.P.U. Simla	22	9542.00
K.U. Kurukshetra - H.A.U. Hissar	14	64563.40
K.U. Kurukshetra - P.A.U. Ludhiana	12	67376.00
P.A.U. Ludhiana - Pbi. U. Patiala	12	69839.00

Table 4 : Ranked list of Chemistry periodicals being subscribed according to the number of Universities subscribing to them.

Sl. No.	Title	Number of Universities subscribing
1	2	3
1.	Journal of Chemical Society	8
2.	Analytical Chemistry	7
3.	Canadian Journal of Chemistry	7
4.	Chemical Abstracts (including indexes)	7
5.	Inorganic Chemisty	7
6.	Journal of Chemical Education	7
7.	Tetrahedron	7
8.	Tetrahedron Letters	7
9.	Chemical Reviews	6
10.	Chemical Society Reviews	6
11.	Journal of American Chemical Society	6
12.	Angewandte Chemie	5
13.	Australian Journal of Chemistry	5
14.	Chemistry and Industry	5
15.	Indian Journal of Chemistry A B	5
16.	Journal of Chemical Thermodynamics	5
17.	Journal of Indian Chemical Society	5
18.	Journal of Inorganic and Nuclear Chemistry	5
19.	Journal of Organometallic Chemistry	5
20.	Talanta	4
21.	Theoretica Chimica Acta	5
22.	Acta Crystallographica A B	4
23.	Analyst	4
24.	Analytica Chimica Acta	4
25.	Annual Report of the Progress of Chemistry	4
26.	Bulletin of Chemical Society of Japan	4
27.	Chemische Berichte	4
28.	Chemistry in Britain	4
29.	Helvetica Chimica Acta	4
30.	Inorganica Chimica Acta	4
31.	Journal of Organic Chemistry	4
32.	Journal of Scientific and Industrial Research	4
33.	Synthesis	4
34.	Zeitschrift fuer Physikalische Chemie	4
35.	Accounts of Chemical Research	4

1	2	3
36.	Journal of Electrochemical Society of India	4
37.	Acta Chemica Scandinavica A B	3
38.	Inorganic and Nuclear Chemistry Letters	3
39.	Journal of the Less Common Metals	3
40.	Journal of Molecular Structure	3
41.	Journal of Photochemistry	3
42.	Acta Ciencia Indica	2
43.	Bulletin de la Societe Chemique de France	2
44.	Carbon	2
45.	Coordination Chemistry	2
46.	Coordination Chemistry Review	2
47.	Current Contents	2
48.	Education in Chemistry	2
49.	Faraday Discussions of the Chemical Society	2
50.	Journal of Applied Polymer Science	2
51.	Journal of Chemical Physics	2
52.	Journal of Colloid & Interface Science	2
53.	Journal of Coordination Chemistry	2
54.	Journal of Electroanalytical Chemistry & Interfacial Electrochemistry.	2
55.	Journal of Medicinal Chemistry	2
56.	Journal of Molecular Spectroscopy	2
57.	Journal of Polymer Science	2
58.	Micro-chemical Journal	2
59.	Macromolecules	2
60.	Monatshefte fuer Chemie	2
61.	Proceedings of the Indian Academy of Science (Section A)	2
62.	Nature	2
63.	Organic mass spectrometry	2
64.	Russian Chemical Reviews	2
65.	Russian Journal of Inorganic Chemistry	2
66.	Science	2
67.	Science Reporter	2
68.	Steroids	2
69.	Synthesis and Reactivity in inorganic and Metal Organic Chemistry	2
70.	Advances in Analytical Chemistry and Instrumentation	1
71.	Advances in Cabohydrate Chemistry	1
72.	Advances in Catalysis and related Subjects	1
73.	Advances in Chemical Physics	1
74.	Advances in Heterocyclic Chemistry	1
75.	Advances in Inorganic Chemistry and Radiochemistry	1
76.	Advances in Organometallic Chemistry	1
77.	Advances in Photochemistry	1
78.	Advances in Physical Organic Chemistry	1
79.	Advances in Protein Chemistry	1
80.	Advances in Quantum Chemistry	1
81.	Agricultural and Biological Chemistry	1
82.	Annales des Chimie	1
83.	Annual Review of Physical Chemistry	1
84.	Chemical Age of India	1
85.	Chemical and Petro-Chemical Journal	1
86.	Chemical Technology	1
87.	Collections of Czechoslovak Chemical Communications.	1
88.	Corrosion Science	1
89.	Current Abstracts of Chemistry and Index Chemicus	1
90.	Current Abstracts of Chemistry and Index Chemicus	1
91.	Discussions of the Faraday Society	1
92.	Drugs and Pharmaceuticals Current Highlights-Industry	1
93.	Drugs and Pharmaceuticals Current Highlights R & D	1
94.	Electrochemica Acta	1
95.	European Polymer Journal	1
96.	Experientia	1
97.	Frensenius Zeitschrift fuer Analytische Chemie	1
98.	Fuel	1
99.	Indian Chemical Manufacturer	1
100.	Indian Journal of Agricultural Chemistry	1
101.	Indian Journal of Chemical Education	1
102.	Indian Journal of Technology	1
103.	Industrial and Engineering Chemistry Fundamentals	1
104.	Industrial and Engineering Chemistry Pt. I, II and III	1
105.	Inorganic Syntheses	1
106.	International Journal of Applied Radistion and Isotopes	1
107.	International Journal of Quantum Chemistry	1
108.	Journal of Agricultural and Food Chemistry	1
109	Journal of Biological Chemistry	1
110.	Journal of Chemical and Engineering Data	1

1	2	3
111.	Journal of Chromatography	1
112.	Journal of General Chemistry of the USSR	1
112.	Journal of General Chemistry of	
113.	Journal of Indian Institute of Science	1
114.	Journal of Macromolecular Science	1
115.	Journal of Magnetic Resonance	1
116.	Journal of Non-Equilibrium Thermodynamics	1
117.	Journal of Organic Chemistry of The USSR	1
118.	Journal of Solution Chemistry	1
119.	Journal of the American Oil Chemist Society	1
120.	Journal of the Association of Official Analytical Chemists	1
121.	Journal of Transition Metal Chemistry	1
122.	Mikrochimica Acta	1
123.	Molecular Photochemistry	1
124.	National Academy of Science Letter A	1
125.	Organic Magnetic Resonance	1
126.	Physica (A,B, and C)	1
127.	Phytochemistry	1
128.	Planta Medica	1
129.	Polymer Preprints	1
130.	Proceedings of National Academy of Sciences	1
131.	Proceedings of Royal Society (A B)	1
132.	Proceedings of the Analytical Division of the Chemical Society	1
133.	Progress in Lipid Research	1
134.	Progress in Physical Organic Chemistry	1
135.	Pure and Applied Chemistry	1
136.	Rasayan Sameeksha	1
137.	Residue Reviews	1
138.	Reviews of Inorganic Chemistry	1
139.	Russian Journal of Inorganic Chemistry	1
140.	Russian Journal of Physical Chemistry	1
141.	Science Today	1
142.	Spectrochemica Acta Pt. A	1
143.	Synthetic Communications	1
144.	Thermochimica Acta	1
145.	Transaction of Metal Chemistry	1
146.	Transactions of the SAEST	1
147.	Trends in Biochemical Science	1
148.	Vijnana Parishad Anusandhan Patrika	1
149.	Zeitschrift fuer Anorganische and Allgemeine Chemie	1

Table 5: Ranked list of certain important journals cited in JICS, 1979

Rank	Journal	No. of Citations	Character
1	2	3	4
1.	Journal of the American Chemical Society (J.Am.Chem.Soc.)	466	General
2.	Journal of the Indian Chemical Society (J.Ind.Chem.Soc.)	452	General
3.	Journal of Chemical Society (J.Chem.Soc.)	437	General
4.	Chemical Abstracts (Chem.Abstr.)	213	"
5.	Indian Journal of Chemistry (Ind.J.Chem.)	209	"

1	2	3	4
6.	Journal of Inorganic and Nuclear Chemistry (J.inorg.nucl.Chem.)	153	Inorg./Nuclear
7.	Journal of Physical Chemistry (J.Phys.Chem.)	141	Physical
8.	Analytical Chemistry (Analyt.Chem.)	88	Analytical
9.	Inorganic Chemistry (Inorg.Chem.)	77	Inorganic
10.	Jounral of Chemical Physics (J.Chem.Phys.)	76	Bridge between Physics and Chemistry.
11.	Journal of Organic Chemistry (J.Org.Chem.)	66	Organic
12.	Canadian Journal of Cnemistry (Can.J.Chem.)	61	General
13.	Transactions of Faraday Society (Trans.Faraday.Soc.)	51	Physical
14.	Chemische Berichte (Chem.Ber.)	48	General
15.	Analytica Chimica Acta (Anal.Chim.Acta)	42	Analytical
16.	Journal of Medicinal Chemistry (J.med. Chem.)	41	Medicinal Chemistry
17.	Current Science	40	all Scientific disciplines
18.	Proceedings of the National Academy of Sciences of India	38	General
19.	Talanta	35	Analytical
20.	Australian Journal of Chemistry (Aust.J.Chem.)	35	General
21.	Nature	34	Sciences Comprehensive Work
22.	Bulletin of the Chemical Society, Japan	34	General
23.	Spectrochimica Acta (Spectrochim.Acta)	34	Spectroscopy

1	2	3	4
24.	Zeitschrift fuer Anorganische und Allgmeine Chemie (Z.anorg. allgem.Chem.)	33	Inorg.&General
25.	Tetrahedron	30	Organic/Pergamon
26.	Journal of Organometallic Chemistry (J.org.metal Chem.)	30	Organometallics
27.	Journal of Biochemistry (J. Biochem)	30	Biochem.
28.	Russian Journal of Inorganic Chemistry (Russ.J.Inorg.Chem.)	28	Reviews
29	Chemical Reviews (Chem.Rev.)	28	Reviews
30	Acta Chemica Scandinavica (Acta Chem.Scand)	28	General
31.	Journal of Colloid and Interface Science. (J. Colloid Interface Sci)	28	Colloides
32.	Soil Science (Soil Sci)	27	Soil Science
33.	Collection of Czechoslovak Chemical Communications. (Coll.Czech.Chem.Commun)	26.	General
34.	Coordination Chemistry Review (Coord.Chem.Rev.)	25	Coord.Chem.
35.	Jounral of Polymer Science (J.Polym.Sci.)	25	Polymer Chemistry
36.	Inorganica Chimica Acta. (Inorg.Chim.Acta.)	25	Inorg.
37	Discussions of the Faraday Society (Discuss.Faraday Soc.)	25	Physical
38	Industrial and Engineering Chemistry Analytical Ed. (Ind.Engg.Chem.,Anal Ed.)	24	Analytical
39.	Journal of Analytical Chemistry of the USSR (J.Analyt.Chem.U.S.S.R.)	24	Analytical
40.	Zeitschrift fuer Physikalische Chemie (Z.Phys.Chem.)	23	Physical Chem. & Chem.Physics

1	2	3	4
41.	Zeitschrift fuer Analytische Chemie**	23	Analytical
42.	Helvetica Chimica Acta (Halv.Chim.Acta)	22	General
43	Journal of the Electrochemical Society (J.electrochem.Soc.)	22	Electrochem.
44.	Chemistry and Industry (Chemy.Ind.)	21	Chem.
45.	Monatshefte fuer Chemie** (Mh.Chem.)	20	General
46.	Proceedings Soil Science Society of America (Proc.Soil.Sci.Soc.Am.)	20	Soil Science
47	Acta Crystallographica (Acta Cryst.)	20	Crystallography
48	Journal of Chemical Education	17	Teaching side
49.	Bulletin de la Societe Chimique de France (Full.Soc.Chim.Fr.)	15	General
50.	Journal of Molecular Biology (J.molec.Biol)	15	Biology
51	Journal of Pharmaceutical Sciences (J.Pharm.Sci)	15	Pharmaceutical Sciences
52.	Chemical Society Reviews	15	Review
53.	Journal of Scientific and Industrial Research (J.Scient.Ind. Res.)	14	General
54	Biochemica & Biophysica Acta (Biochim.Biophys.Acta)	14	Biochemistry & Biophysics
55.	Acta Chimica (Acta.Chim.)	13	General
56.	Tetrahedron Letters (Tetrahedron Lett.)	13	Organic
57.	Analyst	13	Analytical
58	Journal of Catalysis	12	Catalysis
59.	Progress in Inorganic Chemistry	12	Inorganic
60.	Journal of Electroanalytical Chemistry and Interfacial Chemistry	12	Electroanalytical

1	2	3	4
61.	Journal fuer Praktische Chemie (J.Prakt.Chem.)	11	General
62.	Journal of Institution of Chemists (J.Instn.Chem.)	11	General
63.	Mikrochimica Acta (Mikrochim.Acta)	11	General

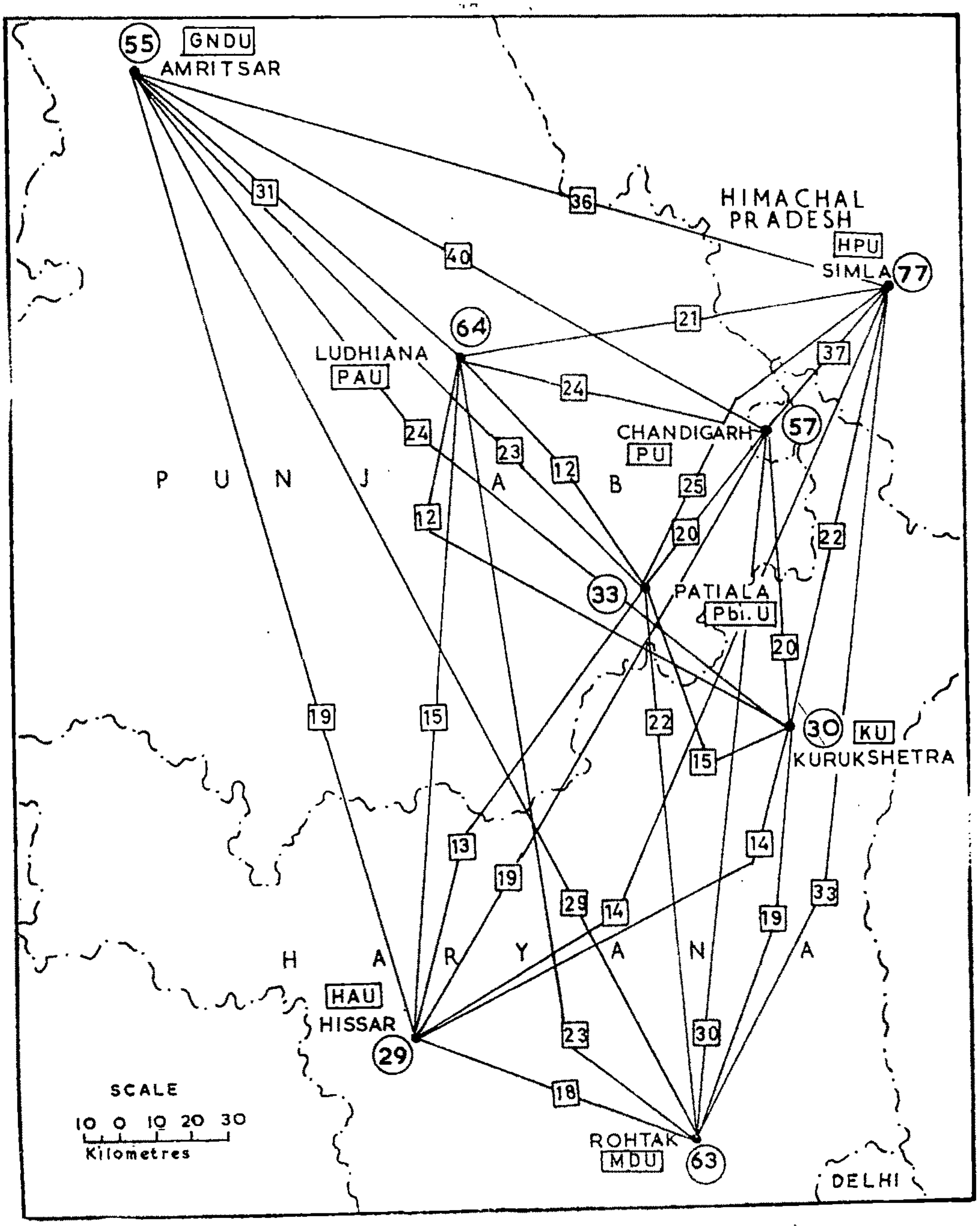

FIGURE 1: INDICATING THE NUMBER OF DUPLICATION OF CHEMISTRY PERIODICALS AMONG DIFFERENT UNIVERSITY LIBRARIES. .

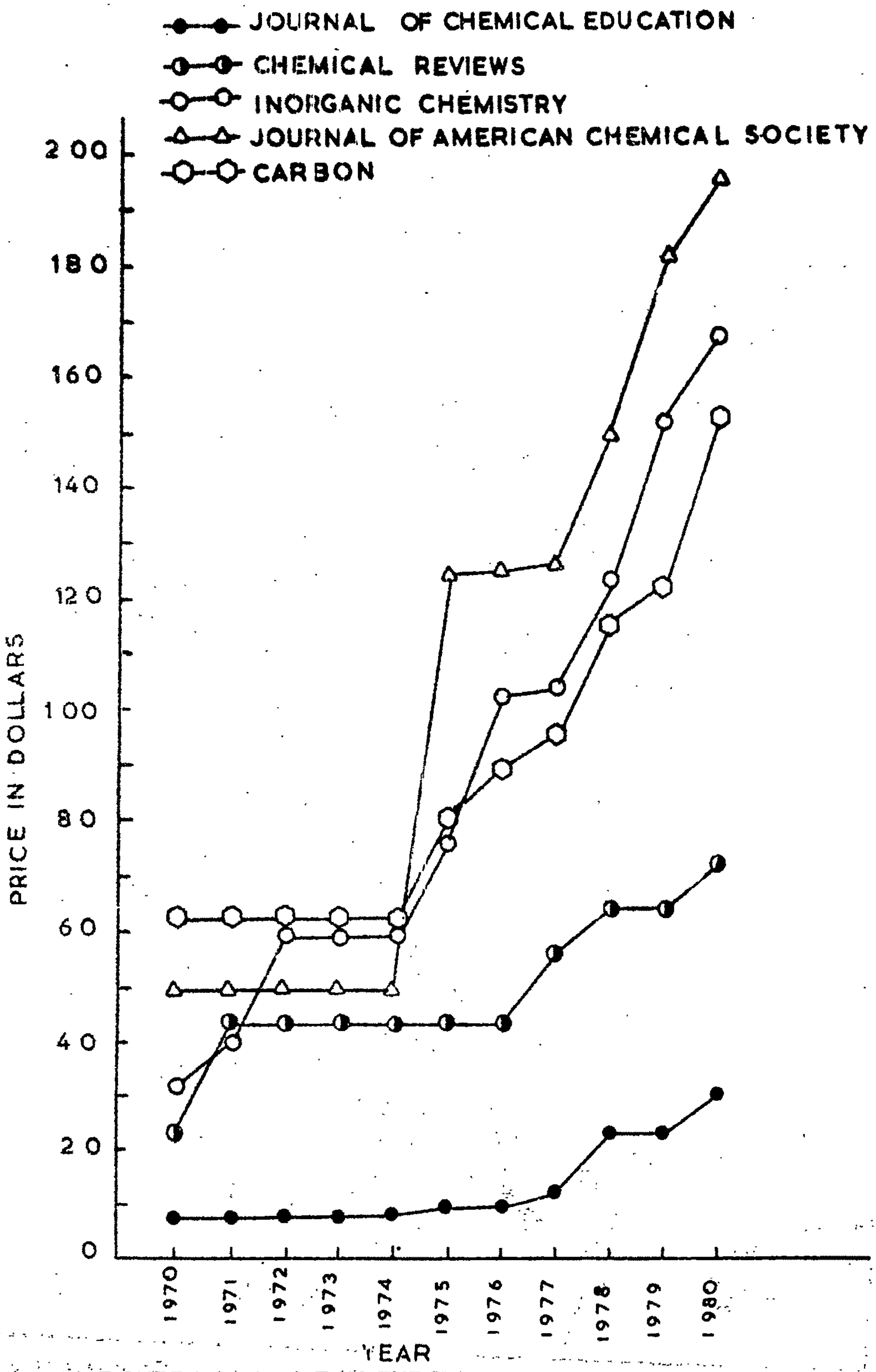

FIGURE 2: INDICATING THE SUBSCRIPTION PRICE TRENDS OF FIVE CHEMISTRY JOURNALS.

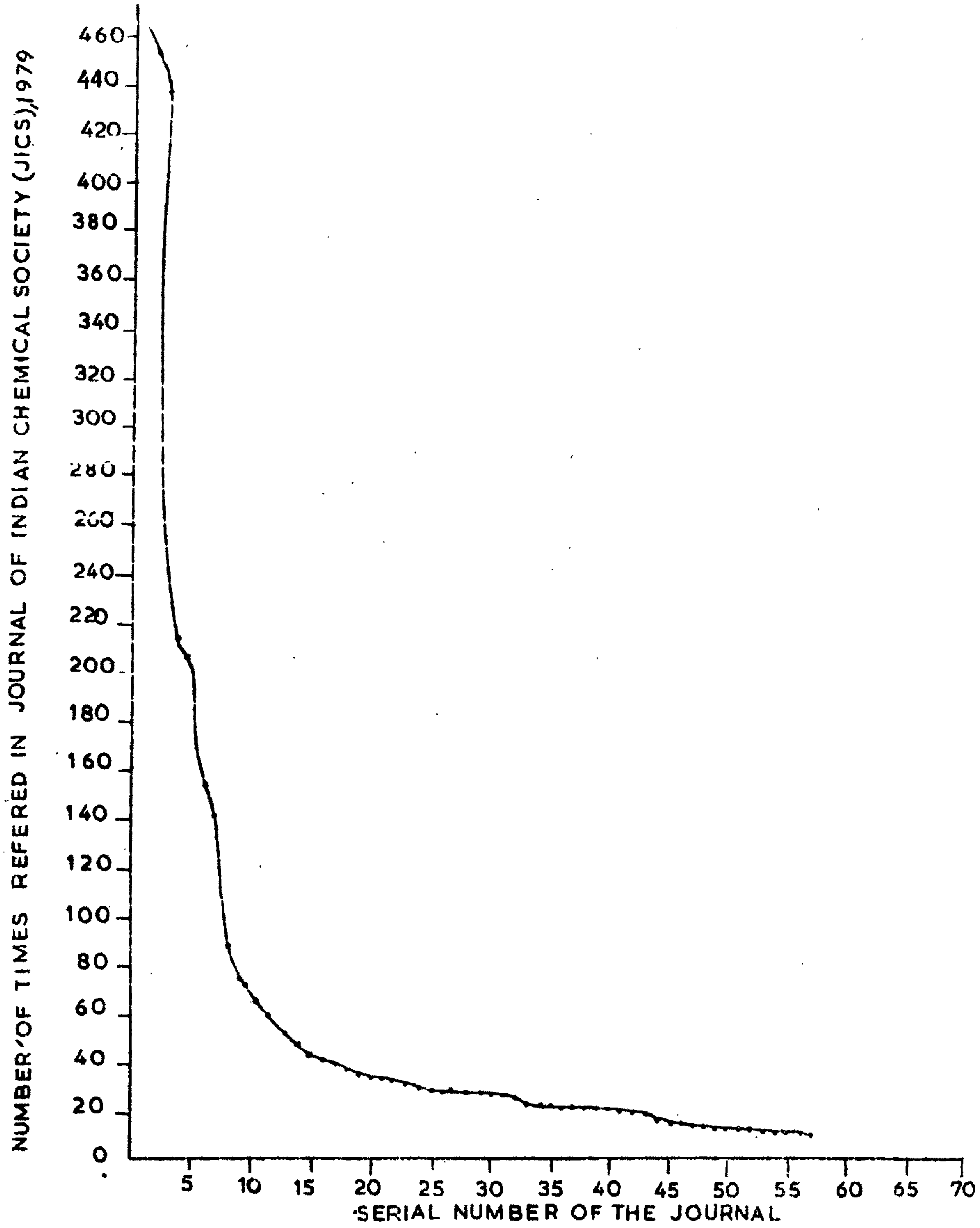

FIGURE 3: GRAPH INDICATING THE TREND OF FREQUENCY OF REFERENCE OF DIFFERENT JOURNALS IN JICS, 1979.

LETTERS

In his article, "Towards Bibliographical Control of Agro-Biological Liteature", [Ann Lib Sci Doc 1982, 29(1), 12-15], Subbaiah has described briefly the important sources in agriculture. While doing so, the author inexplicitly mentioned about Bibliography of Agriculture. This service has originally been derived from CAIN (Cataloguing and Indexing) of National Agriculture Library of the US[1]. Since 1976, CAIN has been widely known as AGRICOLA (Agriculture On-Line Access) emphasising its on-line accessibility as this was the first agricultural data base to go on-line[2]. About 1,38,000 citations were included in AGRICOLA till the end of 1981. As a matter of fact, among the important sources on agriculture, CAB ranks first, AGRICOLA comes second, and AGRIS as third. CRIS (Current Research Agriculture Information System) of the US Department of Agriculture, the only ongoing research information system in agriculture deserves mention[2].

The author further added that there is no information regarding Indian coverage in AGRICOLA. Longo and Machado[3] have portrayed a very clear picture of Indian coverage in CAB, AGRICOLA, and AGRIS. No significant difference exists among these three data bases as far as Indian coverage is concerned. AGRICOLA covers 199 titles representing 3.27% of the total coverage; CAB covers 261 titles representing 3.07% of the total coverage; and AGRIS covers 194 titles representing 3.62% of the total coverage.

[1] Johnston, Susan M. and Gray, D.E. Comparison of manual and on-line retrospective searching for agriculture. Aslib Proceedings, 1977, 29(7), 253-258.

[2] Hall, James L. and Brown, Marjorie J., ed. Online bibliographic databases: An international directory. Ed.2. London; Aslib; 1981.

[3] Longo, Rose Mary Juliano and Machado, Ubaldino Dantas. Characterization of databases in the agricultural sciences. Amer Soc Inform Sci 1981, 32(2), 83-92.

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BOOK REVIEW

International dictionary of acronyms in data processing, library and information systems, by V K Rangra. New Delhi, Citation Publishers, 1982. xiv, 210p. Rs.70.00 (£ 6.00 or $ 15.00)

Use of abbreviations in communication, both oral and written, has become a habit with most people. Out of all forms and varieties of abbreviations, acronyms surely have a special appeal. At times it appears that no serious or respectable activity, programme or service could be started without first giving it the banner of an attractive acronym. This enthusiasm has already resulted in a vast accumulation of acronyms and there is no abatement of it in sight. For obvious reasons, general dictionaries are no longer able to cope up with the volume of these special terms. Hence, compilation of dictionaries of acronyms has become an important related activity. The present volume is an important contribution in this field.

The volume under review provides expansion or explanation to nearly 4000 acronyms and near-acronyms. This surely will appear to be a good coverage in the restricted field as indicated in the title. The author has indicated the wide range of the sources he has used to collect these terms. It must have been a difficult task to decide what should be included and what to exclude in such a compilation. A glance at some of the acronyms which have been finally included brings out, to a certain extent, the nature of the difficulty that has been mentioned. This may be elaborated by a few examples as given below:

There are two abbreviations, KULSA and KULSAA, representing, respectively, Karnatak and Karachi universities library science associations. But there is no mention of, perhaps, the more well known DULSA of the Delhi University. Similar associations are there in most of the library schools. Similarly, the British and Indian standards institutions, BSI and ISI, have been included but equally well known corresponding institutions of West Generamy and the Soviet Union, DIN and GOST, are not included. Further, the names of our library associations, such as, ILA, IASLIC, GILA, INDAAL are mentioned but state library associations are not included. However, DLA (Delhi Library Association) is there. Naturally, one is not able to see the exact line of demarcation between inclusion and exclusion.

The author has conceded that in a work of this nature some errors and omissions are inevitable... The present reviewer was curious to find one very early term in this field which is now frozen in many texts, namely MEMEX, but it has been left out. Similarly, under the term SLIC, what has been given is not what is better known in the library field, namely, J R Sharp's SLIC index, but something different.

The present reviewer has always felt that in all compilations of this nature the term dictionary is used in a very narrow sense. Is it not possible to give something more than the just expansions of the acronyms? Perhaps, the users would like to have some explanation, some details or mention of some source where details could be had. A dictionary of this nature will certainly be more useful.

In spite of what have been said above, the dictionary will serve as a useful reference tool and the compiler deserves to be congratulated for his laborious work.

Perspectives in library and information science – Viswanathan Festschrift, ed by S N Agarwal, R R Khan and N R Satyanarayana. Lucknow, Print House, 1982. 2 vols (xxiv, 408p + xxiii, 215p). Rs 250. [Reviewed by B Guha].

The two-volumed festschrift has been planned and brought out by the Lucknow Branch of the Uttar Pradesh Library Association in honour of Prof. C.G. Viswanathan. Uttar Pradesh, in general, and Lucknow in particular, have been the main places of activities in the long and distinguished career of Prof. Viswanathan. There are quite a few institutions in these places which he started or served with distinction or has been associated with in other ways. Apart from these institutions, there is a sizable concentration of his students, colleagues, and admirers in these places. It is but natural that they would like to pay tribute to a person from whom they have gained so much. However, the contributions in the festschrift volumes have not been restricted to this immediate circle of well wishers.

A look at the contents pages of the volumes reveals that there are as many as 57 papers contributed by 65 authors. By all measure a rich fare. Among the contributors the names of a number of prominent Indian librarians and information scientists are there. There are also a number of prominent authors from abroad. Mention may be made of names of Wilfred Ashworth, Robert L. Collison, A.C. Foskett, F.W. Lancaster, and P. Havard-Williams. From our neighbouring countries there are contributions by A.R. Mohajir from Pakistan and Sarwar Hossain from Bangladesh.

The contributions have been grouped under 8 chapters. The chapter headings will indicate to some extent the wide range of the contents. They are – 1) Philosophy of library and information science; 2) Types of libraries; 3) Organisation of knowledge and techniques of information retrieval; 4) Information systems and services; 5) Cooperation and Coordination; 6) Library and Information science education; 7) Library legislation; and 8) Special topics.

In the first chapter, one is sure to be attracted by the title of F.W. Lancaster's article (with Rashmi Mehrotra as co-author) which reads 'Five laws of library science as a guide to the evaluation of library services? This new interpretation of the Five Laws will be found to be interesting. A number of futuristic studies have given us an impression that our traditional 'libraries will wither away, their historic duties done' by the end of the century. Some librarians feel extremely upset by such a dismal prospect. R. Chakrabartibiswas argues, in his article in the same chapter, that there are a number of retarding forces working and reassures us that "in the year 2001 our libraries will continue with their traditional functions, but will assume the overall appearance of an excellent blend of tradition and modernity". His views certainly deserve attention.

In the second chapter, there are contributions on the National Library, Connemara Public Library, Indian university libraries, American Centre Library, Oriental libraries in India, etc. There is also one article on Special librarianship by no less an authority than Wilfred Ashworth. The author suggests a new definition of a special library as, "... one which is established to obtain and exploit specialised information for the private advantage of the organisation which provides its financial support", and he explains this rather less academic stand.

The third chapter contains articles on schemes of classification, library catalogue, catalogue card service, abstracting and indexing services, indexes and indexing, and citation indexing. R.L. Collison is very much in his own familiar ground of indexes and indexing where he always brings out new ideas and new points of view. In the same chapter, A.C. Foskett gives a critical appraisal of some important library classification schemes.

The fourth chapter is on information systems and services. The only major system that is in focus is the AGRIS. Apart from this there are contributions on NISSAT (Major Thiagarajan), NICLAI, NICFOS and several proposals for bringing about national information systems in the field of agriculture, health, geology, earth science, engineering, social sciences. There is one contribution on UNISIST also.

The fifth chapter is on co-operation and co-ordination and includes three contributions only. Evidently, this is an area where more action is required now and less discussions.

The sixth chapter is on library and information science education, a topic which is attracting the attention of many in the profession. Sarwar Hossain presents the scenario of Bangladesh and that of Britain is presented by P. Havard-Williams. P.B. Mangla provides an overview of the library research scenes of USA, UK and India. Other contributors are K.S.Deshpande, S.R. Bhatia and T.N. Rajan.

The seventh chapter has four contributions on library legislation, of which the first one puts forth a proposal for a national policy in the matter and suggests useful points. The remaining three are proposals for enactment of library legislations in three states, viz., Uttar Pradesh, Bihar, and Jammu & Kashmir.

The eigth and last chapter, labelled as special topics, contains contributions most of which could not be accommodated in the earlier chapters. There are contributions on the role of Unesco, the Indian Library Association, application of PRECIS to Indian languages, and so on. There is also one contribution on health information services network in Pakistan, contributed by A.R. Mohajir. Very appropriately, the last contribution is a personal bibliography of Prof. Viswanathan, compiled by N.R. Satyanarayana.

The above, rather fairly detailed indication of the contents of the volumes, will surely give an idea of the rich variety and wide range of contributions that the Festschrift Committee has been able to collect. Surely, this is creditable. Perhaps, it can be said that these two volumes present the largest collection of professional literature in recent years and surely pay rich tributes to the person in whose honour they have been brought out.

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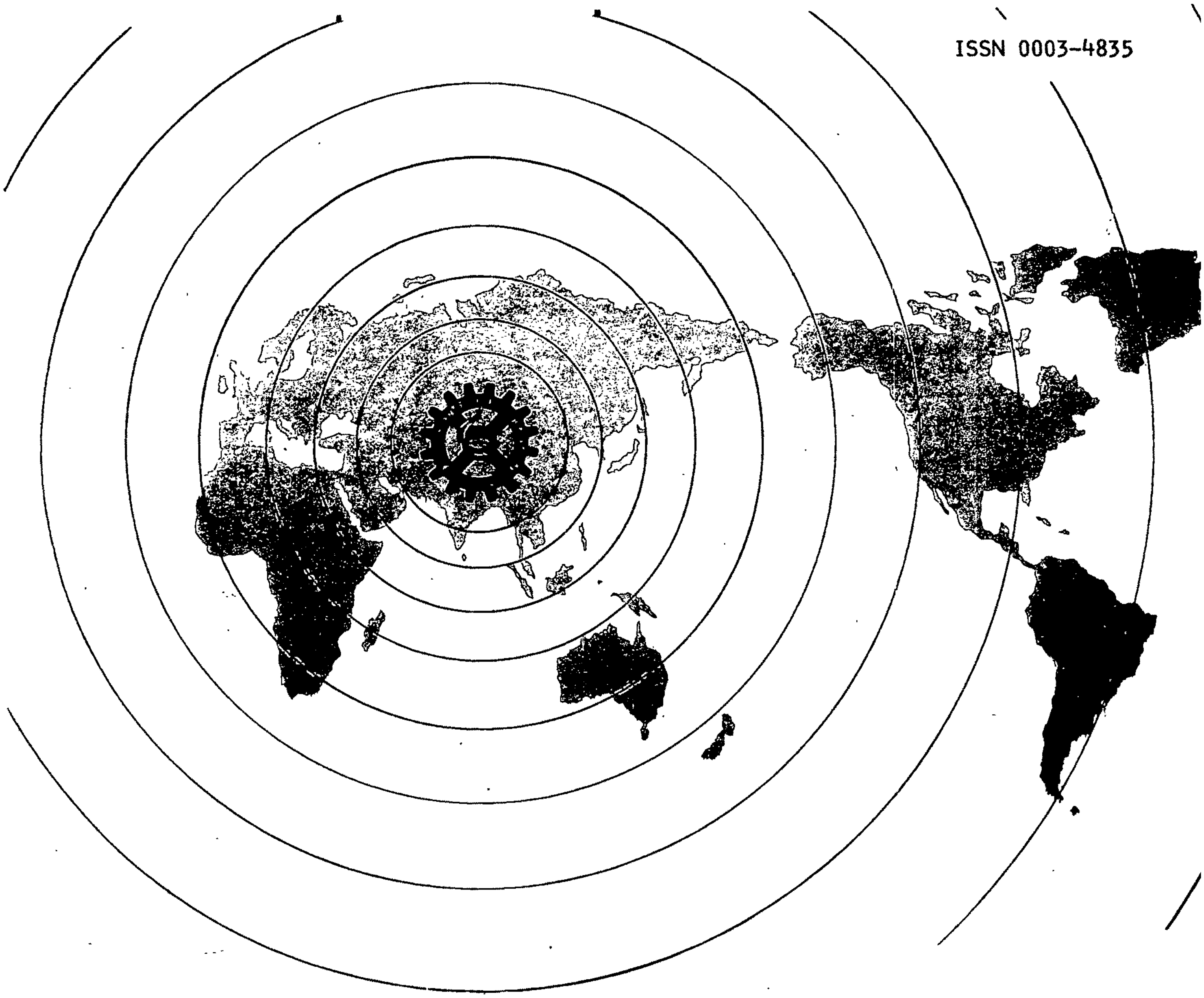

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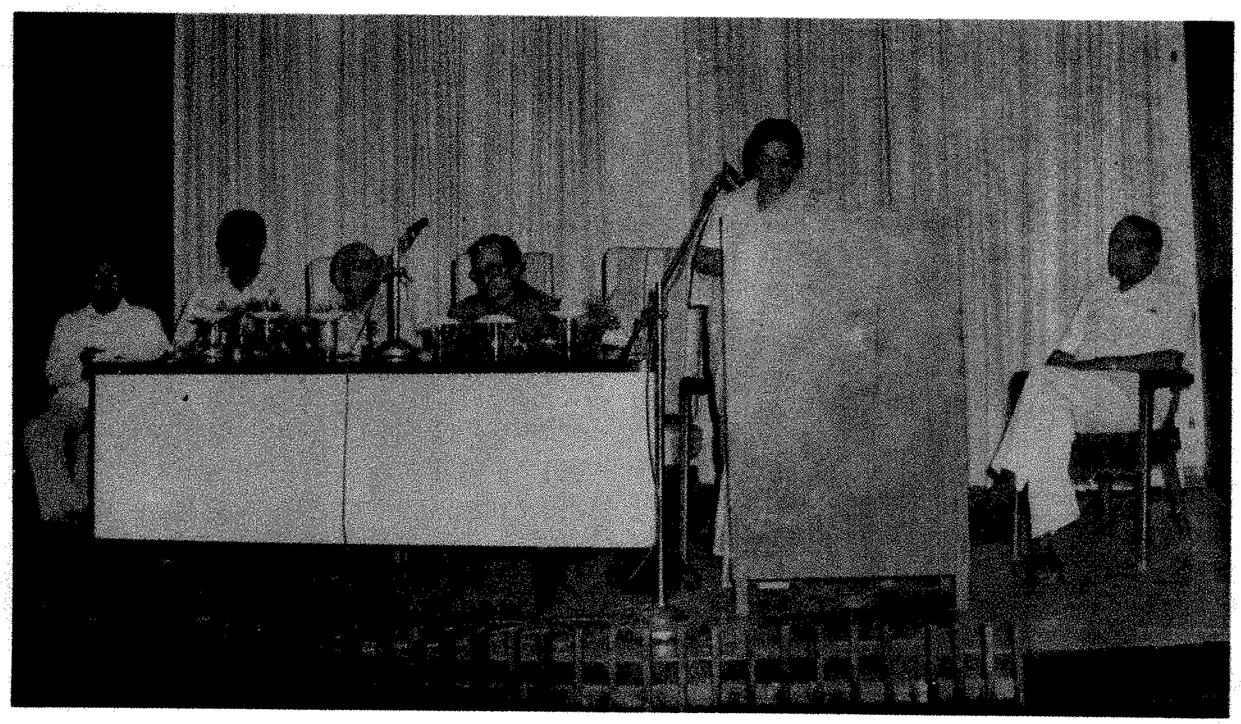

90TH BIRTH ANNIVERSARY OF S R RANGANATHAN – A REPORT

To pay tributes to the memory of late S.R. Ranganathan on his ninetieth birth anniversary, a meeting of Delhi librarians was organised jointly by four library associations, viz., the Indian Library Association (ILA), Indian Association for Special Libraries and Information Centres (IASLIC), Indian Association of Academic Libraries (INDAAL) and Delhi Library Association (DLA). The meeting was held at the CSIR auditorium on 11th August 1982 and was presided over by Professor Rais Ahmed, Vice-Chairman, University Grants Commission. Mrs Sheila Kaul, Honourable Minister for Education and Culture was the Chief Guest and Professor D S Kothari, Chancellor, Jawaharlal Nehru University, was the main speaker. More than 150 librarians in the capital attended the meeting.

In his address of welcome, Shri T S Rajagopalan, Vice-President of DLA, mentioned that free public library service is an essential component in the development of a nation. Ranganathan worked for this cause throughout his life. He mentioned the importance given by the Government for library developmpment. Delhi Library Association, he mentioned, has decided to name its building as Ranganathan Bhavan.

While paying tribute on behalf of the ILA, Prof P B Mangla, its president, recalled the association of Dr Ranganathan with ILA. He was the founder member and president during the years 1948-53, which, Prof Mangla described as the golden period of ILA. He also highlighted the contribution of S R Ranganathan in the international field. Recapitulating the many-fold activities of Ranganathan during his 50 years of association with the library field, Prof Mangla called him a true Karmayogi and a doyen among librarians. Prof Mangla also suggested the constitution of a national commission, on the lines of the US National Commission, to recommend proper library service and to evolve a national policy of library and information services.

The next speaker was Shri B Guha, Vice-President, IASLIC, who recalled, briefly, S R Ranganathan's association with IASLIC and the library profession in general. In this context, Shri Guha mentioned that Ranganathan's prolific writings not only enriched library literature, but, what is equally important, he helped and encouraged many young librarians to write and communicate in an articulate manner. Shri Guha said, "In his writings, Ranganathan was very fond of making a point by giving his arguments in the form of an imaginery dialogue between the librarian or a law or canon of library science with a reader or an administrator or even the education minister... In those days, the education minister was, naturally,an imaginary person. Today, we are indeed happy to have this real dialogue with our Education Minister and also two prominent educationists of our country".

Prof D S Kothari, Chancellor of the Jawaharlal Nehru University, paid handsome tributes by recalling his association with Ranganathan at the Delhi University. He said, he was very much impressed by Ranganathan's great dedication, scholarship, and readiness to learn things. He was a source of inspiration to many. Prof. Kothari, then went on to elaborate the importance of library and information services in a knowledge based society and suggested a number of new and useful indicators to measure the performance of our academic libraries in particular and other libraries in general.

Smt Sheila Kaul, the Education Minister, then delivered her address. She said, "......if librarians feel today that they belong to a distinct profession and they too have an important role to play in the enrichment of the quality of our social life, it is largely due to the pioneering work of persons like Dr Ranganathan". After mentioning some of the activities and contributions of Ranganathan, the Education Minister said that public library service in the context of our country should mean dissemination of useful information from books and other sources of information to our illiterate farmers, artisans and others, in a form which will be acceptable and profitable to them. The library profession has to prepare itself to provide a service of this nature. Professional associations and the library schools have to give a serious thought to this aspect on which will depend the success of the public library movement. The Minister concluded by saying that she hoped the librarians would always be inspired by the example of high standards of scholarship, devotion to an ideal, courage and perseverence set by Dr Ranganathan.

Prof Rais Ahmed, in his presidential address, said that Ranganathan was truly a creative person. Some of the methods of teaching and learning, about which we have been talking only recently, were being actually practiced by him long back. Prof Ahmed also recalled Ranganathan's association with the UGC, and said, he always worked for augmenting and helping libraries wherever it was possible to do so.

Shri M I Ansari, President of INDAAL, proposed a vote of thanks to the Honourable Minister, Prof D S Kothari, Prof Rais Ahmed and the guests on behalf of the sponsoring associations.

DEVELOPING LIBRARY COLLECTIONS IN UNIVERSITY LIBRARIES IN NIGERIA

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The purpose of this study was to examine building library collections in university libraries in Nigeria. It investigated the number of selection policy, acquisition procedure and the relationship between book dealers and the university libraries in Nigeria.

It was discovered that only three universities, or 27.3 per cent have 30 or more books per student. The national average of all universities is 28.5 volume of books per student. Faculty participation in book selection is low in all the universities. In only two libraries, or in 18.2 per cent of cases has the selection policy been formulated in writing. More than 80 per cent of the books bought were imported from foreign countries and on the average it takes three to six months to receive from local dealers.

INTRODUCTION

The Federal Republic of Nigeria is the most populous state in Africa. According to the 1963 census the population stood at 56,654,000. The present population is not known. However, United Nations statistics suggest a figure in the region of 70 million[1].

Since attaining independence from Great Britain in 1960, Nigeria has been steadily building on the educational foundations established during the previous hundred years by Western missionnaries and the British colonial administration. In 1932, Yaba College, the first institution to provide higher education in Nigeria was established by the British in response to demands of local leaders. However, the institution did little more than provide training for middle level personnel for the civil service. In 1948 the college became the nucleus of another higher educational institution, the University College, Ibadan.

On October first 1960, when Nigeria became politically independent, there was only one institution of university status in the country, since then, the development of university education in Nigeria is dramatic and rapid. Out of the existing thirteen universities, seven were established only in 1975, three in 1962, one each in 1969 and 1960[2].

Within the last ten years university libraries have been forced by a number of factors to recognise the importance of adequate and relevant acquisitions of library materials.

The most obvious of these factors is the growth in the campus population and changes in its composition. For instance in 1948 there were 210 students in the University College Ibadan, the only university college in the country[3]. By mid 1960's there were over 7,000 students enrolled in the five main universities in Nigeria. This figure steadily rose to 49,301 students in the thirteen Nigerian universities in October 1977/78 session. 5,787 of the 49,301 were enrolled in sub-degree courses; 41,334 in courses leading to first degrees, and 2,180 for graduate study. The total number of teachers in the academic year 1976-77 session was 4,195[4].

All the university libraries in Nigeria provide services to Faculty members, scholars and students from 8 a.m. to 11 p.m. Monday to Saturday. Readers are entitled to borrow the following number of books: Academic staff and post-graduate students 20 and 10 books respectively for four weeks. Undergraduate students are allowed 5 books for two weeks. Ten kobo are charged for each day a book is overdue. If a book is lost, twice the price of the book must be paid by the offender.

Whilst in most developed countries, students and lecturers have many other libraries (special, school and public libraries) at their disposal in addition to their university library, in Nigeria, students and lecturers are hampered by the scarcity of bookshops, other public libraries[5] and the vast distances between the existing few ones. The purpose of this study is to examine building library collections in Nigeria in this context. Specifically, the study will provide answers to the following questions.

1. What is the selection policy of library materials in university libraries in Nigeria?
2. What is the acquisition procedure in university libraries in Nigeria?
3. What is the relationship between book dealers and the university libraries in Nigeria?

REVIEW OF THE LITERATURE

A good deal has been written and spoken in the last decade or two by Western librarians about the problems and difficulties faced by libraries attempting to select and acquire publications from developing nations. Such factors as the undeveloped state of the book trade in certain countries, foreign currency restrictions and lack of bibliographical control have all created problems to Western librarians. These problems have been overcome or minimised in a variety of ways. There is a remarkable lack of raciprocal effort on the part of librarians in the developing countries, both at the global level and within the individual countries. In order to evaluate various types of selection programmes, one needs to secure hard data, not opinions. Ombu's work[6] was based on his experience in two universities in Nigeria. Similarly, Jegede[7] and Onuorah[8] based their studies on their experiences in the University of Lagos and Nigerian Institute of Social and Economic Research, Ibadan, respectively. Little attention has been paid to building of library materials in Nigeria by way of study, research, and publication. For instance, all the issues of Nigerian Libraries (the only library journal in Nigeria) from volume I, No.1, February, 1964 to Vol.8, No.1, April, 1972 contain 120 articles. Of these only three, or 2.5 per cent, deal with acquisitions[9]. In this paper an attempt is made towards remedying this situation.

PROCEDURE

An examination of library literature provided some information as to the pattern being followed in the building of library materials. It seemed, however, that the most pragmatic answers to building of library materials could be obtained from libraries involved in the day-to-day solutions of building library materials. Toward this end, a questionnaire was designed and sent to all the thirteen functioning universities in Nigeria. The questionnaire sought to discover selection policy, the acquisition procedure and the relationship between book dealers and the university libraries in Nigeria. In addition, the investigators held discussions with some of the teaching staff and book dealers on building library materials. Eleven of the thirteen university libraries contacted replied. Universities of Ilorin and Sokoto (both recently established) did not respond to the enquiry forms.

RESULTS AND DISCUSSIONS

Library Stock

An essential component of the university library is its collection. A variety of up-to-date materials in various formats, and carefully selected, is needed to meet the curriculum and interest needs of the students and faculty members. The decisions concerning amount of materials, the formats, and quantities of supporting equipment should be made on the basis of programmes and user needs. Clapp and Jordan listed the following criteria as a measure for adequacy of academic library collections:

1. The student body ...... size, composition (graduate or undergraduate) scholastic aptitude, socioeconomic and intellectual background.
2. The faculty – size, involvement in research, etc.

3. The curriculum – number of courses, proportion of laboratory to literature courses, etc.
4. Methods of instruction -- extent and use of textbooks reading assigned, and independent study, etc.
5. Availability of suitable places for study on the campus.
6. Geography of the campus .... proximity to other large libraries, etc.
7. The intellectual climate ..... inducements and distractions to study, etc.[10].

The present strength of the stock is presented in Table 1. Three university libraries, or 27.3 per cent have 30 or more books per student. The university of Ibadan, the oldest university in Nigeria possesses one of the best collections in medicine, agriculture and social sciences. It has grown rapidly and its activities before the creation of National Library in 1964 included acting as a legal depository center for Nigerian and other publications, issuing a Nigeria bibliography[11] and a subject catalogue of its collection.

Universities of Nsukka, Zaria, Ife and Lagos (all established between 1960 and 1962)

Table 1: Nigerian University Libraries: Books per student in 1979/80 session

Universities	*Year Established	No. of Registered Students	Volume of Books in the Main Library	No. of Books per Student
Jos	1975	2,700	41,223	15.27
Nsukka	1960	6,500	155,000	23.85
Bayero	1962	2,318	75,000	32.36
Ife	1961	10,000	275,000	27.50
Calabar	1975	2,243	47,000	20.95
Port Harcourt	1975	1,400	21,000	15.00
Benin	1970	2,000	65,501	32.75
Zaria	1962	8,500	237,466	27.93
Ibadan	1948	5,651	350,000	61.94
Lagos	1962	10,000	202,539	20.25
Maiduguri	1975	2,00	50,000	25.00
Total	-	53,312	1519,729	28.51

Year Established refers to the year the University started as post secondary institution have not been improving their library collection as they should. For example in 1967 it was reported that Zaria and Nsukka have 27,000 and 21,300 books respectively[12]. After two or more decades of establishment, none of these older universities has 30 or more books per student. The effectiveness of the university library services depends on materials being made available for use when needed[13].

The University library must possess not only abundant quality books, but also periodicals, newspapers, filmstrips, tapes, and records. The decisions concerning the amount of materials, formats, and quantities of supporting equipment should be made on the basis of programme and user needs.

Although the universities in Nigeria come under the supervision of Nigerian University Commission for finance, there is no real cooperation between the libraries. At present no official statement of general standards for university libraries has been made by either the Nigerian Library Association or the Nigerian University Commission. It would appear that a statement is needed. In many instances the planning of the academic programmes of universities has been done with little or no reference to the book and journal requirements of the programmes created. New departments have been started and later it has been discovered that the library implications have not been taken into consideration, and that no lead-time for collecting the printed materials has been allowed. The librarian has been called in too late. Therefore, standards or guidelines for computing the various factors in book collection building as related to curricular and research programmes are needed. For the time being the Nigerian University Commission may create committee of experts to advise the universities and the Commission on matters relating to library collections and services and to take its recommendations as a criterion for the allocation of grants for the universities to support the library programmes.

Volumes of Books Added from 1976/77 to 1978/79 Session

The majority of students and teaching staff in Nigerian universities cannot afford to build personal libraries and they expect the university library to supply their book and journal needs. In such a situation, regular purchase of library books and other learning aids cannot be over emphasised.

Table 2 shows the growth of library collections in the past three years. While acquisition of library materials in part depended upon the rate at which new publications appear, there are obviously great differences in the growth of library materials among universities. The older Universities of Ibadan, Ife, Zaria, Nsukka and Lagos have very low growth rate. 1976/77 Session was a good year for acquisitions for all the libraries in the study. The number of monographs rose by more than ten and half thousand -- an 8.3% increase over entire collection.

Since 1977/78 session, when the Federal Government of Nigeria introduced Free Universal Primary Education, the funds allocated to the universities have been on the decrease.

Libraries are in competition with other more pressing items in the budget, such as teaching staff salaries. Consequently, library book growth has been greatly affected. In the opinion of the writers, the primary obligation of any university library is to provide the materials which now and in the future best contribute to the fulfilment of the functions of the institution. If the Nigerian government kept on denying the universities enough funds, how would this be achieved? What is worth doing at all, is worth doing well.

Acquisition Policy

Library literature on book selection almost without exception recommends that collection development policies be available in written form. The reasons given range from clarification and guidance to indication of the proper distribution of book funds, or simply helping to achieve the individual's objectives[14].

To discover whether university libraries in Nigeria were to some extent guided in their selection of material by a clear conception of objective, libraries were asked to state whether their objectives had been formulated in writing. In only two libraries or 18.2 per cent has this been formulated in writing. The relatively young age of the universities (seven out of the

Table 2: Nigerian University Libraries: Volumes of books added from 1976/77 session to 1978/79 session.

Universities	Total Collection in Oct. 1976	Volume Added in 1976-77		Volume Added in 1977-78		Volume Added in 1978-79		Total Added in the past 3 Sessions	
		No.	%	No.	%	No.	%	No	%
Jos	25,496	4,308	16.88	5,615	18.84	5,804	16.39	15,727	61.68
Nsukka	122,246	14,679	12.00	9,782	6.99	8,293	5.65	32,754	26.79
Bayero	46,395	8,584	18.50	9,522	17.3	10,499	16.28	28,605	61.66
Ife	249,683	7,219	2.90	8,971	3.49	9,097	3.42	25,317	10.13
Calabar	21,000	10,000	47.61	12,000	38.71	4,000	9.30	26,000	123.80
Port Harcourt	52,857	3,000	5.67	10,532	18.85	4,611	6.95	18,143	34.33
Benin	42,037	8,866	21.09	5,829	11.45	8,769	15.46	23,464	55.85
Zaria	203,227	14,960	7.36	10,721	49.14	8,558	3.74	34,239	16.85
Ibadan	321,974	10,590	3.29	9,642	2.90	7,794	2.28	28,026	8.70
Lagos	167,545	17,264	10.30	10,018	4.59	7,712	3.95	34,994	20.89
Maiduguri	26,943	7,125	26.45	10,148	29.79	5,784	13.08	23,057	85.58
Total	1279,403	106,625	8.33	102,780	7.42	80,921	5.43	290,326	22.69

existing thirteen universities are less than six year old) and the rapid changes in terms of programmes and curriculum may be responsible for only a few university libraries with written policy.

For instance, when the respondents were asked to list new programmes in their universities that would require an expansion of library collections, the list ranged from ten to thirty new programmes.

The above situation is not however, peculiar to Nigeria. Bach, in a study of American Academic Libraries found that reasons advanced against formulation of an acquisition policy in written form varied and include the following:-

1. They are out dated before they are drafted.
2. A library within a university in which the programme of study and research is in a state of flux — old programmes being dropped, new programmes being added can hardly hope, even with faculty assistance, to draft a code that meet the needs of students and faculty today and tomorrow.
3. Lack of faculty cooperation.
4. Difficulty of creating a document that would be useful.
5. Impossibility of the task in view of the extreme complexity of acquisition work and the necessity in many cases to proceed by intuition[15]. Those university libraries that do not have a written policy, however, do not do their acquisitions work merely by what people say.

Written acquisition policy is a necessity in these days of tighter budgets and inflation.

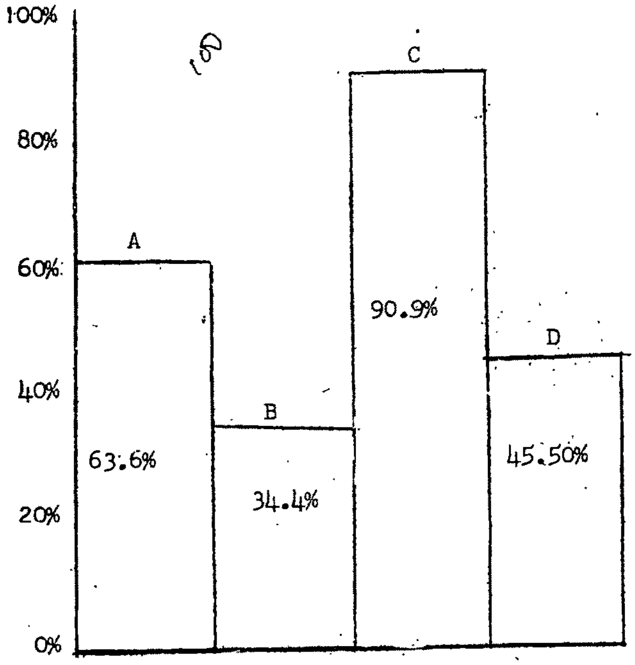

Figure 1 : Histograph of percentage of procedures used in informing teaching staff of new publications.

KEY :

A = Sends circulars or letters to inform teaching staff.
B = Sends book jackets to inform teaching staff.
C = Sends review cards to inform teaching staff.
D = Displays new books to inform teaching staff.

Procedures Used for Informing Teaching Staff of New Publications

In a study of acquisition procedures in university libraries in Nigeria, the librarians were asked to indicate procedures used in informing academic staff of new publications (Figure 1). It is interesting to note that many libraries send review cards (90.9%) and circulars or letters (63.6%) to the teaching staff. This result must be noted with caution. In 1976 at the University of Lagos Library it was discovered that 77% of the titles sent were recommended for purchase by the teaching staff[16]. This is in contrast to the low level of teaching staff participation in book selection found in this study. Certainly, it is a big problem to solicit the co-operation of the teaching staff and a still bigger problem to keep up their interest in recommending titles to the library for purchase. While we should not expect the teaching staff to do the work of selection of library materials without aid or compulsion, full benefit of the special knowledge available with its members should be taken advantage of, and every effort should be made to persuade its members to suggest freely titles for purchase and also to cover systematically the fields in which they work.

Sources of Books Acquired

The acquisitions policy of a university library is determined mainly by the academic programme of the university itself. One, therefore, expects to find on its shelves, books and journals that will meet the needs of undergraduates, lecturers and research workers. Library materials must therefore be acquired in one of three ways: (a) by purchase, (b) by gift, and (c) by exchange. Regardless of the source from which a material is obtained, the efficiency of acquisition work can be measured mostly by the quickness with which the desired publications are obtained and made available to the users of the library. An important factor that influences efficiency is the selection of the right source of supply.

It is interesting to note the source(s) of books acquired in university libraries in Nigeria (Table 3). In all the libraries, the bulk of the library materials are from foreign countries like the United States, Britain and Western Europe. As high as 99.0 per cent of library materials in the university of Calabar are imported from foreign countries. This result is similar to Enu's observation that the majority of the books in the country are published abroad[17]. Indigenous activity is under developed in the publishing and printing industries and also in the writing of books. Even where some form of organized publishing exists, the field is heavily dominated by foreign concerns. Opinions have differed about this fact. For example Benge[18], an

Table 3: Sources of books acquired in 1978/79 session

Universities	Current Serials	Total Books Acquired in 1978/79 Session No.	Sources of Books Acquired			
			Local Dealer		Foreign Dealer	
			No.	%	No	%
Jos	1,200	5,804	290	5.0	5,514	95.0
Nsukka	1,804	8,293	207	25.0	6,220	75.0
Bayero	1,061	10,499	1,050	10.0	9,449	90.0
Ife	4,500	9,097	1,819	20,0	7,278	80.0
Calabar	1,200	4,000	40	1,0	3,960	99.0
Port Harcourt	1,176	4,611	1,383	30.0	3,228	81.8
Benin	3,218	8,769	1,596	18.2	7,173	18.8
Zaria	3,155	8,558	1,284	15.0	7,274	85.0
Ibadan	4,920	7,794	1,559	20.0	6,235	80.0
Lagos	4,780	7,712	1,697	22.0	6,015	78.0
Maiduguri	1,168	5,784	1,157	20.0	4,627	80.0
Total	28,182	80,921	13,948	17.24	66,973	82.76

expatriate, was of the opinion that the localisation of foreign firms has benefitted Nigeria to a large extent. Whereas others[19] have claimed that with regard to educational books (the bulk of their output) they have only helped to impede the growth of indigenous publishing industries. In fact, Oniboje, a Nigerian publisher complained that foreign publishers' attitude towards the indigenous publisher "Varies from open ridicule and a patronising tolerance to outright threats and open hostility"[20]. The fact of the matter is that Nigerian publishers cannot compete effectively with foreign based firms due to (a) lack of skilled manpower and technical difficulties particularly with printing machines and maintenance. It is a cruel irony that the "book revolution" that has occured in the past decades with all that it offers in the way of intellectual, cultural and technical enrichment, has failed to penetrate the very regions where it could be utilised for the general upliftment of the people. Advances in printing and distribution techniques have made it possible to produce books on a scale that has transformed publishing into a mass communication industry. The problem is to bring these techniques to these regions mostly in need of them. In the present day Nigeria, the lack of indigenous and active publishing companies also means that there is a lack of sufficiently organized book trade within the country. Consequently university libraries resort to the use of agents overseas, through whom books are purchased.

Length of Delivery Time

Not all books are needed so urgently. On the other hand, the time when a book is most likely to be useful is the period immediately following the decision to buy it.

The requirements of needs of any library's users are easily stated. They usually want a particular book when it is being reviewed, talked about, displayed in bookstore windows. Metcher and Saul are of the opinion that any library which cannot provide this month's book is a backward library[21]. This may be impossible to achieve in a developing country, such as Nigeria. All the same one would expect a reasonable time of delivery for any book ordered either from local or foreign agents. An examination of the time it takes to receive books ordered from local and foreign dealers indicate that on the average it takes three to six months (Table 4).

The result is not surprising because from experience we can say it takes about six to nine weeks between the actual posting date

Table 4: Time taken to receive books ordered from local and foreign agents

Time it takes an order to arrive	Agents Local No	Agents %	Foreign No	Agents % %
Less than 3 months	3	27.27	-	-
3-6 months	4	36.36	8	72.72
7-9 months	2	18.18	2	18.18
10-12 months	2	18.1	1	9.9
More than a year	-			

from England and the receipt of the book in Lagos. Book consignment from dealers are usually sent by surface mail and therefore, late to arrive and sometimes even gets lost in transit. It is not surprising that some books take 10 to 12 months to be delivered.

The local book dealers are equally slow in delivering library materials. This is because many of the titles required by a university library are unlikely to be stocked by typical Nigerian bookseller. The bookseller is a businessman who is concerned with cash flow and the utilisation of his assets, particularly shelf space. We have already established that he is unlikely to stock many of them (Tables 4 and 5).

The most important thing is that the agent should know from where to get an item so that he can pass it on to his customers in order to stimulate sales.

PROBLEMS ENCOUNTERED BY LIBRARIES AND BOOK DEALERS

The importance of acquisition librarians' evaluating its firm order supplies is mentioned from time to time in the literature of library science. It is generally agreed that before an order goes to any book dealer it is necessary to establish a trade agreement on delivery price, discounts, speed of delivery, invoice documentation, reports on orders, cancellations etc. Like a businessman the acquisition librarian is expected to bargain for the best terms for his library. It is necessary to insist on adherence to the terms and also press for high standard of service by rejecting unsigned invoices, returning soiled and imperfect books and requiring reports on orders. This is more necessary today due to cuts in academic spending combined with the increase in the price of books.

The problem of having many relevant books out of stock seems to be the most common experience from the local book dealers. Similarly, there is no difference between the extent of the problem of speed of delivery by local and foreign dealers. Most bookshops in Nigeria are "a one-man-business." Their capital is meagre with limited stock. The fact of the matter is that Nigerian bookshops and libraries are far from the book producing centres of the world and have to depend to a large extent on foreign book dealers and publishers.

It is interesting to note the disparity in problem of invoice documentation between local and foreign book dealers. There is no difference between local and foreign book dealers in the matter of discount rates (36% each). This result is surprising because the law in Nigeria regarding sale of books is that, books should be sold at publishers price. Libraries, however, are normally entitled to 10-15% discount on publishers price. The result therefore indicates that book dealers -- both local and foreign do not give libraries rebate. From the writers' experience and discussions with book dealers, it appears that they are of the opinion that such discount is used to defray cost of shipping and other incidental expenses. Some of the local dealers in most cases increase the prices.

The acquisition librarians complained of Government restriction on foreign exchange -- which in their opinion slow down acquisition work. On the other hand, local book dealers complained of the inability of the university libraries to settle their bills promptly. The foreign book dealers always insist that money must accompany each order.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The general purpose of this study is to examine building of library collections in university libraries in Nigeria. Specifically, it investigated the number of books per student, annual growth of library materials, type of selection policy, acquisition procedure and the relationship between book dealers and the university libraries in Nigeria.

Data relating to building library materials were collected through the use of an enquiry form. Discussions were held with some acquisition librarians and book dealers. A total of eleven completed enquiry forms were received, representing 84.6% of the universe of the population.

Three universities, or 27.3% have 30 or more books per student. The national average of all universities is 28.5 volume of books per student. Faculty participation in book selection is low

Table 5: Problems encountered from book dealers

Problems	Extent of problems																			
	Local Dealers								Foreign Dealers											
	V.High		High		Moderate		Low		V. Low		V. High		High		Moderate		Low		V.Low	
	No.	%	No.	%	No.	%	No.	%	No	%	No.	%	No	%	No	%	No	%	No	%
Discount	1	9.1	3	27.3	6	54.5	1	9.1	-	-	1	9.1	3	27.3	4	36.4	2	18.2	1	9.1
Speed of delivery	1	9.1	4	36.4	3	27.3	2	18.2	1	9.1	1	9.1	3	27.3	6	54.5	1	9.1	-	-
Invoice documentation	2	18.2	4	36.4	2	18.2	1	9.1	1	9.1	1	9.1	3	27.3	4	36.4	1	9.1	2	18.2
Frequency of out of print books	1	9.1	1	9.1	4	36.4	2	18.2	3	27.3	3	27.3	1	9.1	4	36.6	1	9.1	1	9.1
Frequency of out of stock books	4	36.4	4	36.4	1	9.1	-	-	2	18.2	1	9.1	2	18.2	4	36.4	3	27.3	1	9.1
Others	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

in all the universities. In only two libraries, or 18.2% cases has the selection policy been formulated in writing. In all the libraries, 80.0% or more of the books are imported from foreign countries and on the average it takes three to six months to receive books ordered from foreign and local dealers. The frequency of "out of stock" books seems to be the most common problem experienced from local dealers.

From the analysis of data above, the following conclusions may be drawn:

Quality education is impossible without a quality library. There is need for all the libraries to increase their collections. The present annual growth of less than 10% is too low to produce quality education as desired by the people, states and federal government! The writers recommend an annual growth in book collection of 50% for each of the new universities and 25% for the older universities for the next ten years.

The present system of selection largely by acquisition librarians cannot produce the quality of collections needed. There is need for more cooperation from faculty members in book selection. A practical alternative might be centralized selection on a national basis. The Nigerian University Commission would manage the programme and would hire subject specialists (60 individuals with background in different disciplines should be able to insure good coverage) who would examine all new books currently being published and who would decide which books were appropriate for the undergraduate and graduate level. The 60 specialists would select 750,000 volumes per year. It will enable all the universities to have a comprehensive collection of books and periodicals covering all the subjects taught in a university.

The Nigerian government should remove books from the list of items that are subject to stringent exchange controls. There should also be a council whose sole responsibility will be to promote the writing, publishing and the distribution of books. The objectives of the council should include:

(i) to serve as the spokesman for the book industries in questions of finance, taxation, customs regulations etc.

(ii) to promote, assist and, where necessary, co-ordinate plans for concerted action on such questions as the training of personnel,

(iii) to provide information related to the book trade and practice which can serve the development of books and reading generally.

References

[1] Year book of the Commonwealth. London, HMSO, 1977. p.358-371.

[2] Guide to education and training resources in the developing countries of the Commonwealth – a selection of post-secondary courses and institutions. London, Commonwealth Secretariat, 1977. p.254-262.

[3] Fafunwa, A. Babs. The universities of Nigeria in Commonwealth universities yearbook. Hugh W. Springer and T. Craig editors. Edinburgh, R.R. Clark Ltd. 1976. p. 1773-1825.

[4] Commonwealth universities yearbook 1979. Edinburgh, R.R. Clark Ltd. p.1861-1829.

[5] Onadiran, G.T. and Onadiran, R.W. Users of public library services in Nigeria. Indian Librarian 1980, 35(1), 27-48.

[6] Ombu, Jigekuma A. Acquisition problems in developing countries. International Library Review 1977, 9(1), 83-93.

[7] Jegede O. Problems of acquisitions of library materials in a developing country: University of Lagos library experience. International Library Review 1977, 7(2), 235-39.

[8] Onuorah, Regina U. Acquisitions of government publications in Nigeria. Special Libraries 1976, 67(12), 585-88.

[9] Nzotta, Briggs C. Written acquisition policies in public libraries in Nigeria. Nigerian Libraries 1973, 9(1-2), 83-89.

[10] Clapp, Vernor W. and Robert T. Jordan. Quantitative criteria for adequacy of academic library collections. College and Research Libraries 1965, 26(5), 376-80.

[11] Enu, Cosmas E. Problems of Nigerian university libraries. Unesco Bulletin for Libraries 1973, 27(2), 84-91.

[12] Plumbe, W.J. Ahmadu Bello University Libraries: The first three years. Nigerian Libraries 1967, 3(2), 46-62 and Obi, Dorothy S. The University of Nigeria Libraries. A preliminary survey of their development and resources. Nigerian Libraries 1967, 3(2), 69-74.

[13] Onadiran, G.T. and Onadiran, R.W. Current problems in school library development in developing nations. School Librarian 1980, 28(1), 14-17.

[14] Buzzard, Marion L. Writing a collection development for an academic library, collection management, 1978, 2(4), 317-28. Rogers, Rutherford D. and David C. Weber, University Library Administration, New York, Wilson Company 1971, pp.114-45 and Ford, Stephen, The Acquisition of Library Materials. Chicago, American Library Association 1973, p.1-2.

[15] Bach, Harr, Acquisition policy in American academic library. College and Research Libraries 1957, 18(6), 442.

[16] Jegede, O. 1977. ibid.

[17] Enu, Cosmas E. Problems of Nigerian University Libraries. Unesco Bulletin for Libraries 1973, 27(2), 84-91.

[18] Benge, Ronald Charles. Cultural crisis and libraries in the Third World. London, Clive Bingley 1979, 167-71.

[19] Bandara, S.B. Provision of periodicals in the libraries of Sri Lanka. International Library Review, 1975, 7, 15-28.

[20] Oniboje, G.O. Wanted, a cultural revolution, not a dialogue. In Oluwasanmi, E. and others (ed.), Publishing in Africa in the seventies. University Office Press 1975, p.268.

[21] Metcher, Daniel and Margaret Saul. Metcher on Acquisition. Chicago, American Library Association, 1961. 169p.

[22] See Ford Stephen, The Acquisition of Library Materials. Chicago, ALA, 1973. p.62. Lyle, Guy R. The Administration of the College Library, 4th ed., New York, H.W. Wilson, 1974. p.186-87 and Higham, Norman. The Library in the University; Observations on a service. London, Andre Deutch Ltd., 1980. p.46.

INDIAN SCIENCE ABSTRACTS – USERS' SURVEY

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INTRODUCTION

The Indian Science Abstracts (ISA), a monthly abstracting publication of Insdoc was introduced in the year 1965. The object of starting this comprehensive service was threefold: (i) It was felt that a national abstracting service having adequate coverage of published Indian scientific contributions could serve as a feeder service to the international abstracting services, since according to a number of surveys the coverage of Indian scientific contributions in these services is not adequate; (ii) Indian scientists have a tendency to publish their contributions in foreign periodicals. One of the reasons advanced by the scientists is that their contributions in Indian periodicals do not get due recognition at international level because they either remain unnoticed or noticed very late in the international abstracting services. ISA proposes to meet this requirement as a feeder service; (iii) A permanent record of Indian scientific contributions could be built in order to serve as the retrospective search of the information; (iv) A comprehensive inventory of the Indian work would help the science planners in the country to assess the progress of research, in general, and also to spot the fallow regions where more stress is necessary.

ISA covers original contributions by the Indian scientists including short communications, review and informative articles published in scientific and technical periodicals, proceedings of conferences and symposia, monographs and other ad-hoc publications. Theses from various Indian universities, Indian standards and patents, and the communications by the Indian scientists appearing in foreign periodicals are also noticed in the ISA.

It is now seventeen years since ISA started publishing. It was thought to undertake a survey of users of ISA in order to get their views and suggestions. It was decided to get the views of potential users also. They included those who are not able to refer to ISA due to its non-availability in their library in spite of their awareness about the ISA. Some are not at all aware of it but are likely to be users if they are informed about the existence of ISA.

SURVEY PROCEEDURE

In order to obtain opinion regarding the ISA, a questionnaire was designed. The questions were framed to elicit information mainly on the following points:

1. Type of the institutions, such as universities, colleges, research organisations, industries, etc, of the users.
2. Aspect of work, such as research, production, design, management, teaching and information, in which the users are engaged.
3. Use of Indian scientific contributions and various other channels followed to get the relevent contributions.
4. The number of scientists who are aware of the publication of the ISA and making use of it. In this respect, attempt has also been made to know the number of scientists not referring to ISA for their information needs in spite of their knowledge about the existence of ISA. It was also attempted to know whether ISA meets their needs and if not, reasons for the same.

5. The responses to the questionnaire would reveal the number of scientists expressing the usefulness of such a national service. At the same time, their suggestions through the questionnaires for enhancing the usefulness of ISA could be obtained.

6. Provision had also been made in the questionnaire to know about the Indian and foreign scientific periodicals, which were frequently referred to by the scientists for their information needs. This was to help us to give more stress on such Indian periodicals and ensure exhaustive coverage of the Indian contributions. Moreover, it would be possible for us to select foreign periodicals relevant to the needs of the Indian scientists, so that it will be possible to scan such periodicals regularly and to give coverage in ISA to the papers contributed by the Indian scientists in these foreign periodicals.

Distribution of Questionnaire

The questionnaires were sent out in December 1980 to various institutions which were receiving the ISA. A few questionnaires were also distributed amongst the scientists attending the Indian Science Congress Session at Varanasi held in the year 1980. The details of the distribution of the questionnaires and the feedback is shown in the Table 1.

Break-up of the Types of Institutions

The break-up of the 128 institutions from whom the questionnaires were received back is given in Table 1A.

Fig.1A: Distribution of questionnaires and feedback

	No. of institutions (a)	No. of individuals (b)	No. of institutions receiving ISA (c)	Percentage User Instns over (a) (d)
Questionnaires sent	393	2085	252	64
Questionnaires received	128	454	87	68

Fig.1A: Types of Institutions

			Percentage over total
Teaching Institutions		75	58
Colleges	28		
Universities	26		
Others	21		
Research Institutions		43	33
Industries		10	8
Total		128	

Users of ISA - their profession, work aspect and subject fields

Tables 2, 3 and 4 bring out information about the users of ISA – their professional status, work aspect and subject fields of their interest. This information is gathered in order to indicate the representation of the users from various professions, subject fields, etc, who have expressed their opinion about ISA and given suggestions for improving it.

Table 2 indicates that the number of users from the educational institutions and those from research institutions is almost equal. Professionally, however, the number of users doing teaching is much more than those engaged only in research work in the educational institutions. On the other hand, in the research institutions and industries, there does not obviously seem to be any teaching staff, the scientists are engaged in research only. Table 3 also indicates the same observations as that in Table 2 so far as the profession and work aspect is concerned. Activities, such as design, production and management are noticed to be existing mostly in industries. A few of the research institutions, however, seem to be engaged in design aspect of work. Information activity exists in all the types of institutions.

It would be clear from Table 4 that our users, who responded to our request for filling the questionnaires, cover almost all the subject fields. Maximum number of users are from agricultural sciences, followed in decreasing order by medicine, botany, chemistry, biology, geology, physics, instrumentation and chemical industry. Various sub-fields of engineering, such as, electrical, electronics, civil, designing, ma-

Table 2: Professional status of the users vs. type of institutions

Professional Status	Teaching Inst. College (a)	Univ. (b)	Other (c)	Total (d) (a+b+c)	Res. Inst (e)	Industry (f)
Reader	4	15	3	22	-	-
Lecutrer	9	13	5	27	-	-
Professor	25	31	21	77	-	-
Scientist*	1	5	32	38	135	5
Research Asst.**	1	27	19	47	36	16
Engineer	-	-	-	-	11	16
Information Scientist/Librarian	1	2	2	5	14	5
TOTAL	41	93	82	216	196	42

Grand Total of d,e,f, :454

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* *Includes scientists of the status of officers onwards*

** *Includes research assistants, research scholars*

Table 3: Work aspect of the users

Type of Work	Educational Inst.	Res Inst.	Industry	Total
Research	85	171	27	283
Teaching	126	-	-	126
Design	-	11	6	17
Production	-	-	4	4
Management	-	-	1	1
Information	5	14	4	23
TOTAL	216	196	42	454

terials science, mechanical, nuclear sciences, production, railway, etc. together come next to biology.

Indian Scientific Literature - Importance to Indian Scientists

Since ISA publishes abstracts of the Indian scientific literature, it will be worthwhile to examine how far our scientists accept such literature. On the basis of the amount of use of the Indian scientific literature by our scientists, it is possible to estimate the importance of ISA to our scientists. This estimate may relate to purely one aspect of importance and usefulness of ISA. Whether ISA actually serves any purpose to our scientists is a different question. This aspect has been taken up latter on.

Table 5 indicates the number of users of Indian primary journals. It also indicates the number of users of ISA and number of users consulting only international abstracting and indexing services to find out about Indian research contributions.

Percentage calculation of the response shown in Table 5 works out as follows:

(1)	Use Indian journals	76%
(2)	Use ISA	36%
(3)	Use international services	56%

It can be seen from the above response that quite a substantial number of our scientists are interested in referring to the Indian scientific journals for their information needs. ISA, however, seems to be of help to a few scientists in comparison to the use of Indian journals. Whereas, more scientists seem to depend on international services to know about Indian contributions. The discussion that follows may reveal the reasons for this apparent meagre use of ISA. But, before going on to this part of the discussion, it will be proper to know some of the reasons why about 25% of the scientists (i.e. 106) do not find any use of the Indian journals. The following reasons, which the scientists put forward through the questionnaires, may reveal their views about Indian journals.

1. Indian journals have very limited international circulation.

2. Generally, there is a feeling that the papers published in foreign journals carry more weight and more importance is attached to such papers.

3. Most of the papers are published only to claim the number of publications without any substance in them. In fact, the research results are much below standard and/or insignificant results are reported. This view is expressed by about 65% of the scientists.

Table 4: Users from different subject fields

Subject Field	Education	Research	Industry	Total
1	2	3	4	5
Agriculture & Animal Science	6	66	-	72
Anthropology	-	1	-	1
Biology (incl.Bacteriol, Biochem, Microbiology etc.)	22	8	7	37
Botany	31	30	-	61
Chemical Industry	1	12	6	19
Chemistry	26	16	2	44
Civil Engineering	-	10	1	11
Computer Science	1	1	-	2
Demography	5	-	-	5
Designing	-	-	1	1
Electrical Engineering	1	3	-	4
Electronics	1	1	1	3
Environmental Science	1	2	-	3
Fishery	5	1	-	6
Fossils	-	-	2	2
Geology	10	14	-	24
Instrumentation	-	20	-	20
Materials Science	-	-	1	1
Mathematics & Statistics (incl.Operational Research)	9	2	-	11
Mechanical Engineering	5	-	1	6
Medicine (incl.Antibiotics & Psychology)	41	13	7	61
Metallurgy	-	-	2	2
Nuclear Science	1	1	-	2
Physics	18	2	2	22
Production Engineering	1	-	-	1
Railway Engineering	-	2	-	2
Solar Energy	3	-	-	3
Space Science	2	9	-	11
Speech Research	1	-	-	1
Sugar Technology	-	-	1	1
Timber Industry	-	1	-	1
Ecology	11	3	-	14
TOTAL	202	218	34	454

Table 5: Use of different sources for Indian scientific contributions

Type of Institution	Indian journals		ISA		International Services	
	Use	Do not use	Use	Do not use	Use	Do not use
Educational Instn	163		61		125	
Research Institution	176		91		122	
Industry	9		12		9	
TOTAL	348	106	164	290	256	198

4. About 57% of the scientists not using Indian journals expressed that either periodicals in their field of interest are not published at all in India or are not available in the city or other easily approachable places.

5. About 30% of the scientists do not use the Indian literature due to the inordinate delay in the publication. Equal number of scientists expressed that there is a very limited scope for the Indian publications since these constitute a fraction of the world literature. A highly qualified scientist and having a senior position has given a list of his contributions indicating that he used to publish his earlier papers in the Indian journals. He observed that it took more than five to six years for publishing his papers in the Indian journals.

Reasons for not referring to ISA

It has been mentioned above that out of 454 scientists who responded to the questionnaires, about 290 scientists (about 63%) do not use ISA. About 5% and 14% of these scientists do not use either due to the availability of other Indian abstracting/indexing services specific to their fields of interest (may be local documentation services) or ISA is not available or not known to them respectively. According to about 38% of the scientists, ISA does not serve their purpose due to three main reasons, namely: (i) ISA is published late; (ii) there is a big time gap between the publication of primary documents and their reporting in ISA; and (iii) limited coverage in ISA. A very insignificant percentage of the scientists (i.e. about 8%) expressed that due to unsatisfactory indexing and the abstracts not bringing out clearly the results and conclusions, ISA does not satisfy their needs.

General Opinion of the Scientists regarding the Usefulness of ISA

About 85% (numbering 387) of the scientists who filled in the questionnaire favoured the publication of the ISA. According to them ISA can be a very useful source of information provided it is brought out in time and its coverage is increased. They also offered a few suggestions for making ISA more useful. The suggestions are stated below alongwith the percentage in favour of each suggestion.

1. ISA should be brought out promptly with its date of publication corresponding to the calender month (61%).
2. Time gap between the date of primary publication and the reporting of the papers therein in the ISA should not be more than three months (49%).
3. Periodicity of ISA should be made fortnightly (25%).
4. Improvement in Keyword Index is necessary in order to meet the specific needs (27%).

5. Subject headings require more standardisation (21%).
6. Five yearly cumulative indexes will be useful (25%).
7. By-products of ISA, such as bibliographies on specific topics should be brought out separately (48%).
8. Coverage should be increased by adding papers by Indian scientists published in selected foreign journals (55%).
9. Personalised service through cards on specific subjects of interest will be useful (34%).

It can be seen from the above suggestions that the majority of the scientists want that ISA should be brought out promptly and its coverage should be increased. Apart from the above, there were a number of other suggestions, some of which are briefly stated below.

According to a number of respondents, ISA should be brought out in two parts covering: (i) biological sciences, and (ii) physical sciences. It was also stated that there is no abstracting service for medical journals. "Index to Medical Publications", though an important service, is published far behind schedule. At the same time ISA covers only a few medical journals published in India. It is suggested that Insdoc should start a separate index to medical periodicals.

Grouping of abstracts for reports, patents, standards and theses in a separate section would be, according to some, more convenient to the users interested in this type of information. It was further suggested that separate keyword index for papers on standardisation and standards should be provided. According to one suggestion, a separate index under each genus including new taxa with clinical importance and industrial usefulness will be of immense value. Abstracts for theses are not provided at present and it was suggested to do so for increasing the circulation of ISA.

ISA was said to be more useful to the science planners in our country. In order to serve the research scientists, this service should cover the world literature on the same lines as is done by VINITI and CNRS in their abstracting services.

DISCUSSION

The foregoing observations have emerged from an analysis of the answers and comments made by the scientists in response to our questionnaire. It will be worthwhile to restrict our discussion on the question of published works of Indian scientists in Indian journals and the use of ISA by the Indian scientists, since these two aspects are inter-related. It can be seen from the data, presented earlier, that a good number of Indian scientists do refer to Indian journals for knowing about the research results from India. The reasons advanced by some scientists who look down upon the Indian scientific journals and therefore do not refer to them do not seem to have a strong base. Some of the scientists have pointed out that the research results published in Indian journals are much below standard. There are, however, a few Indian journals which publish contributions of high standard. Due to a limited number of such journals it is not possible to cope up with increasing number of contributions and hence the scientists concerned are compelled to publish them in foreign journals as is evident from the statement of one of the highly qualified and senior scientist holding high position. If more and more quality Indian scientific journals are published, especially by the learned institutions, probably the problem of delay in publication of Indian contributions in Indian journals could be solved. Many contributions of value and high standard could thus be published. Moreover, many contributions, which, according to a few scientists are below standard, cannot be completely discarded since they definitely contain at least some substance of importance. In this way if all the Indian contributions are published in Indian journals, the circulation of the Indian journals will increase internationally. It is also upto our scientific community to support our own media of publication of scientific contributions. Many Indian journals start publishing and cease publication within a short time. One of the reasons may be lack of contributions or lack of funds.

It is commented that Indian journals do not have wide circulation and hence our scientists would like to contribute in foreign journals.

In fact, Indian Science Abstracts can help the Indian contributions in Indian journals in making them known widely. Moreover, Indian journals will automatically get wide circulation if all the Indian contributions are published in our journals. Many scientists do not refer to ISA due to its delayed publication and limited coverage. This aspect will be taken care of very shortly. Steps are being taken in this direction. So far as abstracts are concerned, it may be said that mostly author abstracts are used for the purpose and therefore they can be relied upon. Authors of the contributions are the best persons to write abstracts of their own contributions. Much time is also saved by including them in the ISA.

A suggestion has been made to cover in the ISA world literature on the same lines as the abstracting journals of VINITI and CNRS, in order to enhance the usefulness of ISA. Though this is a welcome suggestion, it should be noted that the purpose of ISA and that of VINITI and CNRS abstracting journals are not the same. VINITI and CNRS are compelled to cover world literature in their abstracting services due to language problem. Most of the world literature is in English and a few other languages and therefore they cover the abstracts of such literature in Russian and French languages in their services. We do not have this problem and therefore instead of covering the world literature, only Indian contributions are covered. We would, however, like to cover Indian contributions appearing in the foreign journals in ISA, which is one of the objectives of ISA.

FINDINGS

From the foregoing survey of data and discussions on the same, it may be said that ISA, the only comprehensive medium of information for the Indian scientific contributions, is welcomed by the majority of the scientists. It requires a little more attention to make it more popular and more useful. It may briefly be said:

1. Lot of efforts are needed to bring the current issues of ISA in line with the calender months.
2. Coverage is required to be increased to a very great extent.
3. The present time lag between the publication of original contributions in primary journals and their reporting in ISA should be reduced. ISA can also be brought out in parts covering different subject areas, which will help institutions specialising in any particular subject area in subscribing to that part only in which they are interested.
4. Publicity measures should be taken in a big way so that the circulation of ISA can increase and it can go to the hands of many more scientists.
5. Librarians should take steps to bring to the notice of the scientists the existence of ISA. It is found that ISA, though subscribed by some institutions, is not in the knowledge of the scientists of these institutions.
6. Librarians, information scientists, documentalists and scientists may bring to the notice of the Editors of ISA any shortcomings or problems encountered at the time of referring to ISA so that improvements can be effected, if necessary. In fact, a constant interaction between the Editors of ISA and the users of ISA is very essential.
7. During the discussions between the author of this contribution and the scientists and engineers working in an industry, it was suggested that ISA should also be industry-oriented so that various industries could make use of it for their information needs.

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QUESTIONNAIRE

I S A APPRAISAL

1. Name & Designation:
2. Name & Address of the Institution:

3. Division/Section:
4. Subject field of interest:
5. What aspect of work are you engaged in ? (Please tick the **relevant** block)

   Research ☐ Design ☐ Teaching ☐

   Production ☐ Management ☐ Information ☐

6. Do you scan Indian scientific literature regularly ? Yes/No
7. If 'no', please tick relevant reason(s) stated below:
   - (a) No periodical relevant to my field of interest is being published
   - (b) The research results published are much below standard
   - (c) Inordinate delay in the publications of research papers
   - (d) Insignificant results and findings are reported in Indian periodicals, whereas the original & important ones appear in standard foreign periodicals much earlier
   - (e) Very limited scope for Indian publications since they constitute a fraction of world literature
   - (f) Not available in the library or other easily approachable sources
   - (g) Other reasons, if any:

8. Name below the Indian periodicals which you scan **regularly**:
   (1)
   (2)
   (3)
   (4)
   (5)

9. How do you keep abreast of Indian scientific contributions ?
   Please tick relevant answer/s as stated below:
   (a) By regularly scanning primary periodicals relevant to the field of interest ☐
   (b) By referring to international abstracting & indexing services ☐
   (c) By referring to the 'Indian Science Abstracts' ☐
   (d) By consulting 'Documentation Lists', regularly brought out by the library/information division ☐
   (e) Other sources, if any (Please state)

10. Are you aware of the publication of 'Indian Science Abstracts' ? Yes/No
11. If 'yes', are you using it regularly ? Yes/No
12. Does it meet your needs ? Yes/No
13. If 'no', please tick the relevant reason(s) as stated below:
    (a) Published late ☐
    (b) Big time gap between the publication of primary document and its reporting in ISA ☐
    (c) Indexing is not satisfactory. Key-words do not match with specific requirements ☐
    (d) Coverage too limited ☐
    (e) Results & conclusions are not clearly brought out in the abstracts ☐
    (f) Other Indian abstracts/indexes specific to the field of interest meet the needs more appropriately ☐
    (g) Other reasons, if any (Please state)

14. Do you think a publication like this is useful ? Yes/No
15. State your suggestions for making this publication more useful by putting tick mark to the relevant statement(s) given below:
    (a) Publication for any particular month for a particular year should be released latest by the next concerned month (e.g. January 1980 publication must come out latest by February 1980) ☐

(b) Time gap between the primary publication and the reporting of papers in the ISA should be three months or even less ☐

(c) ISA should be brought out fortnightly (or even less periodically) to facilitate the quick information dissemination ☐

(d) Key-word index should be improved in order to meet the specific needs ☐

(e) Subject headings require more standardisation ☐

(f) In addition to 'annual cumulations' of the index, 'five/ten-yearly cumulations' will be useful ☐

(g) Byproducts of ISA, such as bibliographies on specific topics, should be brought out regularly. ☐

(h) Coverage should be increased by adding the papers by Indian scientists published in selected foreign journals ☐

(i) Personalised service through cards on specific subject fields of interest as and when such topics appear in the ISA are to be supplied ☐

(j) Other points, if any:

16. Kindly mention below the names of foreign journals in order of preference, which are most relevant to your subject field.

COMPUTER-BASED INFORMATION RETRIEVAL SYSTEM IN MEDICINAL AND AROMATIC PLANTS USING A MINICOMPUTER HP-1000 SYSTEM

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An experimental information storage and retrieval system in the field of medicinal and aromatic plants, based on the database of Medicinal and Aromatic Plants Abstracts (MAPA) service of the Publications and Information Directorate is reported. The machine readable database created from the first three 1982 issues of MAPA is designed for searches by keywords, first author, journal, language, and by subject groupings as followed in the printed version of MAPA. The search can be either single aspect of any of the above or in combination of different searchable elements with Boolean logic. The programs have been developed in FORTRAN IV on a HP-1000 minicomputer system.

INTRODUCTION

A bimonthly abstracting journal (MAPA) covering the fields of medicinal and aromatic plants is being brought out by PID since 1979 under its MAPIS service. Since its inception, the keyword indexes are being brought out by a computer. The keyword index is given along with every issue of MAPA and the December issue contains cumulated keyword and author indexes. The data for both the author and the keyword index entries are stored on magnetic tapes for future cumulated indexes.

Computers are now being increasingly used for data processing and information retrieval all over the world. Some computer-aided indexes and directories have been brought out in India by a few organizations concerned with scientific publications and information dissemination[1-6]. Now, an effort has been made to develop an information retrieval system in medicinal and aromatic plants, after gaining experience in bringing out the computer-aided indexes, by storing only the bibliographic details of all the abstracts on a magnetic tape. Such a database (DB) will be used to meet the requirements of specific technical queries and to bring out bibliographic lists on demand. The author index entries could be generated from this DB itself.

SYSTEM DESCRIPTION

The reported system christened as "COMPASS" (Computerized Medicinal Plants Abstracts Searching Service) is designed for a HP-1000 minicomputer with 32K core memory, two magnetic tape drives (800 bpi), one floppy drive (.5 MB), one card reader and a 400 lpm dot-matrix line-printer, FORTRAN IV being the higher-level language available under RTE-M(II) operating system.

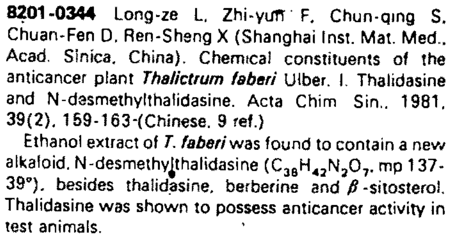
Searchable Elements of the Database

The main approach of searching the DB is through a set of descriptors. The subject content of MAPA abstracts cover wide spectrum of phytochemistry, biochemistry, botany, medicine, pharmaceuticals, agriculture and other miscellaneous subjects and no single comprehensive thesaurus covering all the disciplines is available. In view of the cost and time considerations in terms of staff for developing a comprehensive thesaurus over so many broad fields, maintaining and updating, indexing is done by assigning keywords mostly from the titles without a controlled vocabulary. Where titles are vague, keywords from the abstract and/or original text are provided. Available thesauri are used at the time of searching for including synonyms, broad terms and related terms etc. Thus, the concept is freely indexed in variant forms like verbs and nouns ending with differences due to tense, person, number etc. as well as adjectival and adverbial forms with some spelling variations in some cases. Right-hand truncation technique for searching descriptors is used optionally in the search programs to retrieve a concept which is indexed under its variants as mentioned above. Thus TOXIC* is used in searches to retrieve the documents indexed under TOXIC, TOXIC EFFECTS, TOXICITY etc. Broad concepts can also be retrieved using the right-hand truncation. Similarly, using PAPAVER* for searching, all the documents related to the genera *papaver* will be retireved, although they are indexed under *papaver braceatum, papaver rhocas* and *papaver somniferum* and not separately under *papaver.*

In addition to the subject approach, searches can also be conducted by journal name, language of the paper, first author and subject groupings as given in the printed version of MAPA issues, like agronomy, botany, etc. either singly or in combination. A seven digit code (the first character being the starting letter of the journal, followed by a 5-digit code) is assigned for each journal with one check digit as the seventh character. For language, the first three letters are used as the code. A four digit numeric code is assigned for the subject groupings.

FILE ORGANIZATION

The format of printed version of MAPA abstracts is shown in Fig.1. Data are punched using an EC-9002 key-to-tape in 160-byte records and a maximum of three blocks are allotted for each abstract. The first block contains information as shown below:



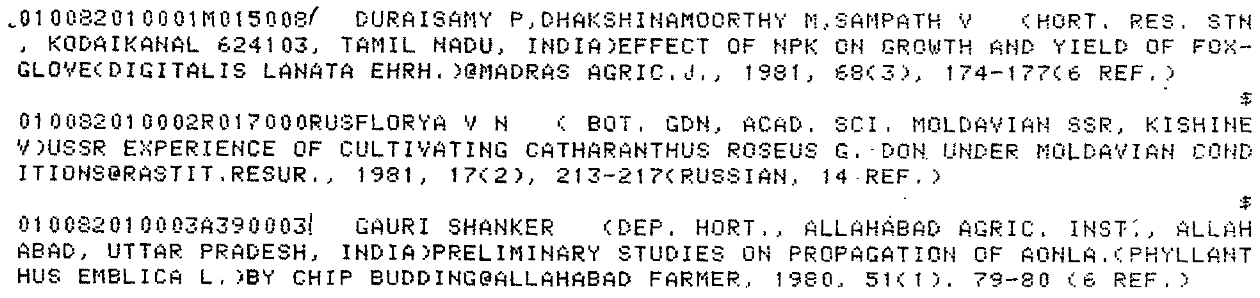
8201-0344 Long-ze L, Zhi-yun F, Chun-qing S, Chuan-Fen D, Ren-Sheng X (Shanghai Inst. Mat. Med., Acad. Sinica, China). Chemical constituents of the anticancer plant ***Thalictrum faberi*** Ulber. I. Thalidasine and N-desmethylthalidasine. Acta Chim Sin., 1981, 39(2), 159-163-(Chinese, 9 ref.)

Ethanol extract of ***T. faberi*** was found to contain a new alkaloid, N-desmethylthalidasine ($C_{38}H_{42}N_2O_7$, mp 137-39°), besides thalidasine, berberine and β-sitosterol. Thalidasine was shown to possess anticancer activity in test animals.

Fig. 1. Sample abstract from a MAPA issue.

Bytes	Description
1-4	Subject Grouping Code (Numeric)
5-6	Year (Numeric)
7-8	Issue Number (Numeric)
9-12	Abstract Number (AN) (Numeric)
13-19	Journal Code
20-22	Language Code
23-160 & subsequent blocks up to 3	Authors, Institution, Title, Journal Name etc. (In 160th character of the last block a "$" sign is recorded).

Termination of various fields, e.g. authors, institution, title etc, is indicated by delimiters. The author entries are separated by



```
01008201 0001M015008/  DURAISAMY P,DHAKSHINAMOORTHY M,SAMPATH V   <HORT. RES. STN
, KODAIKANAL 624103, TAMIL NADU, INDIA>EFFECT OF NPK ON GROWTH AND YIELD OF FOX-
GLOVE<DIGITALIS LANATA EHRH.>@MADRAS AGRIC.J., 1981, 68<3>, 174-177<6 REF.>
                                                                               $
01008201 0002R017000RUSFLORYA V N   < BOT. GDN, ACAD. SCI. MOLDAVIAN SSR, KISHINE
V>USSR EXPERIENCE OF CULTIVATING CATHARANTHUS ROSEUS G. DON UNDER MOLDAVIAN COND
ITIONS@RASTIT.RESUR., 1981, 17<2>, 213-217<RUSSIAN, 14 REF.>
                                                                               $
01008201 0003A390003|  GAURI SHANKER   <DEP. HORT., ALLAHABAD AGRIC. INST., ALLAH
ABAD, UTTAR PRADESH, INDIA>PRELIMINARY STUDIES ON PROPAGATION OF AONLA.<PHYLLANT
HUS EMBLICA L.>BY CHIP BUDDING@ALLAHABAD FARMER, 1980, 51<1>, 79-80 <6 REF.>
```

Fig. 2. Sample of Citation File (160-byte).

commas; the institution name is enclosed within left and right parenthesis, the title immediately follows and is terminated by an "@" symbol. Fig.2, shows a sample of 160-byte records file.

Main File (Bibliographic File): A program validiates the data for correct serial number, journal code, delimiters of institution, title and journal. From this 160-byte records file, another program creates the main file with 512-byte record length, a sample of which is shown in Fig.3.

Inverted Files: An inverted file (File 1A) of 50-byte record length is created from the main file with the following format (Fig.4):

Bytes	Description
1-8	Year, Issue Number, Abstract Number
9-48	Term (First Author or Subject Grouping or Journal code or Language code)
49-50	Term Type (AU, SG, JC, or LA)

Another inverted file (File 2A) is created for keywords with same 50-byte format as above containing "KW" in byte position 49-50 (Fig.5). Both these inverted files are linked with the main file through the 8-digit No. of year, issue No. and abstract serial No.

Since controlled vocabulary is not utilized for indexing, the keywords are subjected to a "squeezing" procedure i.e. eliminating the special characters like blank, comma, hyphen and apostrophe and then sorted. This is done with a view to get correct matching of free descriptors mostly lifted from the titles for indexing. The descriptor to be used for search is also squeezed before carrying out the search from the sorted inverted squeezed files. Using "ANTI-INFLAMATORY ACTIVITY" for the search, the squeezing operation helps the retrieval of all the following terms indexed as:

ANTI INFLAMMATORY ACTIVITY
ANTI-INFLAMMATORY ACTIVITY
ANTI INFLAMMATORY ACTIVITY
ANTIINFLAMMATORY ACTIVITY
ANTIINFLAMMATORYACTIVITY

Keyterms selected by the subject specialists are punched in their normal form as 80-byte records using the key-to-tape machine. The terms are then squeezed and generated as 50-byte records containing the term-type "KW" in the byte positions 49-50. The first author entries are also generated as similar 50-byte

```
010082010001M015008                                   DURAISAMY P,DHAKSHINAMOORTHY M
,SAMPATH V(HORT. RES. STN, KODAIKANAL 624103, TAMIL NADU, INDIA)EFFECT OF NPK ON
 GROWTH AND YIELD.OF FOX-GLOVE(DIGITALIS LANATA EHRH.)@MADRAS AGRIC.J., 1981, 68
(3), 174-177(6 REF.)

010082010002R017000RUS                                FLORYA V N(BOT. GDN, ACAD. SCI
  MOLDAVIAN SSR, KISHINEV, USSR)EXPERIENCE OF CULTIVATING CATHARANTHUS ROSEUS G.
 DON UNDER MOLDAVIAN CONDITIONS@RASTIT.RESUR., 1981, 17(2), 213-217(RUSSIAN, 14
REF.)

010082010003A390003                                   GAURI SHANKER(DEP. HORT., ALLA
HABAD AGRIC. INST., ALLAHABAD, UTTAR PRADESH, INDIA)PRELIMINARY STUDIES ON PROPA
GATION OF AONLA.(PHYLLANTHUS EMBLICA L.)BY CHIP BUDDING@ALLAHABAD FARMER, 1980,
51(1), 79-80 (6 REF.)

010082010004I446009                                   GEORGE C K(DTE COCOA, ARECANUT
 & SPICES DEV., CALICUT 5, KERALA, INDIA)VANILLA CULTURE: A SCIENTIFIC APPROACH@
INDIAN COCOA ARECANUT SPICES J., 1981,5(1), 1-3

010082010005I450006                                   GUPTA S,SOBTI S N,ATAL C K(REG
. RES. LAB., JAMMU TAWI 180001, JAMMU & KASHMIR, INDIA)SOME OBSERVATIONS ON GROW
TH AND DIOSGENIN CONTENT OF MEXICAN DIOSCOREAS INTRODUCED AT JAMMU@INDIAN DRUGS,
 1981, 18(12), 435-440(7 REF.)
```

Fig. 3. Sample of the Main File (512-byte).

```
820206440300                                       SG
820206450300                                       SG
820206460300                                       SG
820206470300                                       SG
820206480300                                       SG
820206490300                                       SG
820206500300                                       SG
820106510300                                       SG
820206520300                                       SG
820312200300                                       SG
820312210300                                       SG
820312220300                                       SG
820312230300                                       SG

82031532CHI                                        LA
82031542CHI                                        LA
82031575CHI                                        LA
82031585CHI                                        LA
82031629CHI                                        LA
82031650CHI                                        LA
82031656CHI                                        LA
82031657CHI                                        LA
82031658CHI                                        LA
82031672CHI                                        LA
82031704CHI                                        LA
82031705CHI                                        LA
82031706CHI                                        LA

82010265CORTESMM                                   AU
82020862COSTASS                                    AU
82010077COUDRETA                                   AU
82031301COUTSELINISA                               AU
82031302COUTSELINISA                               AU
82010266CRAVEIROAA                                 AU
82010507CSEDOK                                     AU
82010585CSEDOK                                     AU
82020629CZABAJSKAW                                 AU

82010476D017000                                    JC
82020831D022004FRE                                 JC
82021072D022004FRE                                 JC
82020727D029009                                    JC
82021092D700002                                    JC
82010448D700002GER                                 JC
82010449D700002GER                                 JC
82010477D700002GER                                 JC
82020703D700002GER                                 JC
82021062D700002GER                                 JC
```

Fig. 4. Sample records from Inverted File 1A (50-byte).

squeezed records containing "AU" in the byte positions 49-50. This is done with a view to improve the matching of author entries containing special characters like apostrophe, hyphen and imbedded blanks. Obviously, the other term-types do not require this treatment. Thus both the files (File 1A and File 2A) contain positions 9 to 48 as the searchable field. The files are sorted on this field and AN (cols 5-8).

Since many entries are repeated with different ANs, the entries are consolidated into 80-byte records using column 1-40 for the descriptor, 41-42 for the term-type, 43-44 for a counter showing the number of consolidated entries in the record, 45-46 for year, 47-48 for issue number and 49-80 for storing up to eight 4-digit ANs. This makes the file compact and the searching time is also reduced. File 1 and File 2 are created in the format described, using File 1A and File 2A.

SEARCHING PROCEDURE

The system is designed for batch processing of the queries. Since the available memory partition for a user program is around 12K in the system, up to 10 queries can be processed at a time. Each query can store relevant document numbers up to 250. Every volume of MAPA has to be searched separately due to these constraints. About 4000 papers are covered in a volume. Each query can contain up to 180 total descriptors in the programs developed at present which can be extended up to 600 if necessary.

Each query is analysed by the search editors and terms of potential interest are collected. Thus, synonyms and related terms etc. are added to the list from the subject knowledge of the search editor as well as consulting some thesauri, classification schedules, subject indexes of related secondary journals etc. From the knowledge of the terms used in indexing, words are truncated to improve the matching

```
82010329ABIESCEPHALONICA                  KW
82020769ABORTIFACIENTACTIVITY             KW
82020769ABORTIFACIENTACTIVITY             KW
82021090ABORTIFACIENTS                    KW
82031312ABORTION                          KW
82031316ABORTIONTREATMENT                 KW
82031316ABORTIONHABITUAL                  KW
82020890ABROSANOLIDES                     KW
82010134ABRUSPRECATORIUS                  KW
82010453ABSINTHIUM                        KW
82031382ABSORPTION                        KW
82031397ABSORPTION                        KW
82010453ABUSE                             KW
82020832ABUTILONGLAUCUM                   KW
82020832ABUTILONINDICUM                   KW
82020833ABUTILONINDICUM                   KW
82031264ACACIAARABICA                     KW
82031264ACACIACATECHU                     KW
82020811ACACIAPULCHELLA                   KW
82020811ACACIAPULCHELLA                   KW
82010551ACALYPHAINDICA                    KW
82021006ACALYPHAINDICA                    KW
82031408ACALYPHAINDICA                    KW
82021006ACALYPHAMIDE                      KW
82010028ACCLIMATIZATION                   KW
82031207ACCUMULATION                      KW
82031301ACELYLCHOLINESTRASEACTIVITY       KW
```

Fig. 5. Sample records from Inverted File 2A (50-byte).

as already described. The truncated word is indicated by putting a star (*) as the last character as explained before. From a careful study of the wording given in the query, keyterms are related by adding the Boolean logical operators (OR, AND & ANDNOT) to provide the search logic. Each query is numbered with a three digit number and each keyword is given another three digit number for a given query. A sample of terms used in a query with the query number and the keyword numbers is shown in Fig.6(a). The finalized terms are arranged in the form of concept maps following the practice described in the CAN/SDI manual[7]. The term type is not used at present in the searching keyterms. The provision kept now will be used later on for specific purposes. A sample of 5 test queries translated into the format of a concept map along with the query logic used is shown in Fig.7. It is to be noted that apostrophe symbol (') is used in place of NOT symbol (¬) and "-" is used in place of THROUGH operator (→) as they are not available on the HP console keyboard. End of the search logic is indicated by the character question mark (?).

```
001001AYURVEDIC*
001002UNANI*
001003FOLK*
001004TRADITIONAL*
001005TRIBAL*
002001PIPER*
003001GINSENG*
004001ANTIFERTILITY*
004002C450006*
005001CANCER*
005002ANTI-CANCER*
005003C045004*
```

(a)

```
005002ANTI-CANCER*
004001ANTIFERTILITY*
001001AYURVEDIC*
005003C045004*
004002C450006*
005001CANCER*
001003FOLK*
003001GINSENG*
002001PIPER*
001004TRADITIONAL*
001005TRIBAL*
001002UNANI*
```

(b)

Fig. 6. (a). A sample query list, (b) Sorted sample query list.

Code C450006 is for the journal Contraception *and C045004 for* Cancer Chemother. Pharmacol.

Searching Program

Search keywords are sorted on the term (Columns 7-46) in the beginning (Fig.6b). The search program compares each descriptor with that of File 2 (and File 1 if indicated) and outputs on to another tape the hits as a ten byte record, i.e. 3-digit query number, 4-digit abstract number and 3-digit keyword number. The File 1 and File 2 are kept on the same tape reel and provision is made in the search program to indicate the number of files to be searched. In case the number of files is given as more than 1, the search keyword tape is rewound and searching starts afresh with all the given number of files. If the searches contain a combination of keyword and any one or more of the other searchable elements, both the files will be searched. In case the search(es) is (are) merely confined to keyword combinations, File 2 is only searched. The search keywords can be given either on tape or on cards.

The hit records file is sorted on characters 1-10. Using this sorted file, a search-logic-processing program requests to key in the search logic for each query. At the end of processing the logic of all the queries, it stores the abstract numbers of relevant documents for each query in the core. It also consolidates the number of citations to be output for all the queries, using the main file sorted by the ANs, writes them on to a diskette (optionally to a tape if they exceed 800 due to space constraints on a single diskette). Then, the relevant documents for each query are output in a column width of 60 characters. In case, more than 800 documents are written on to the tape, the tape is searched serially, the citations are printed for one query, the tape is rewound and the procedure is repeated as many times as there are number of queries. The system flow chart for COMPASS is given in Fig.8. A sample output from five test queries (as shown in Fig.7) is given in Fig.9. All the programs described above are in FORTRAN IV along with a number of assembler subroutines for string manipulations.

CONCLUDING REMARKS

This system is initially designed for batch processing of queries over fixed intervals of time using the HP-1000 minicomputer with the configuration already described. The design of the system viz., the file organization, search procedure, final output of the citations is thus planned in accordance with the capabilities of a minicomputer where large disc space and

Query No.	Terms	Query Logic
1	[A. AYURVED* B. UNANI* C. FOLK* D. TRADITIONAL* E. TRIBAL*]	(A/B-D/E)?
2	[A. PIPER*]	(A)?
3	[A. GINSENG*]	(A)?
4	[A. ANTIFERTILITY*] AND [B. C450006*]	(A) & (B)?
5	[A. CANCER* B. ANTI-CANCER*] AND NOT [C. C045004*]	(A/B) &' (C)?

Fig. 7 - Concept map for 5 test queries along with query logic [Codes C450006 and C045004 are for the journals Contraception and Cancer Chemother Pharmacol]

more I/O units, operating system supported IOCS (viz. blocking, etc.) are lacking. With minor modifications, it can be designed to organise SDI services searching about 800 abstracts for a monthly current awareness service (CAS). As it is, about 20 profiles can be processed. A method is being explored to manage even 100 profiles in one run (for a file with a total of 800 records in the DB for CAS) by means of some bit manipulations using the same query-logic-processing program in a partition of 12 K memory.

ACKNOWLEDGEMENTS

The authors are grateful to Shri Y.R. Chadha, Chief Editor, and Shri R.N. Sharma, Scientist E-II, PID, for the encouragement and facilities given to take up this work and permission to publish this work. Sincere thanks are also due to Shri S. Nagarajan, Head, Technical Information Services Division, for helpful discussions.

REFERENCES

[1] Murty D.S.R. Publication of KWOC index of a research journal using IBM 1620. Ann Lib Sci Docum, 1972, 19, 205-21.

[2] Murty D.S.R. and Arora A.M. Processing of Union Catalogue of serials data using an IBM system 360 computer. Ann Lib Sci Docum, 1974, 21, 85-94.

[3] Raizada A.S., Haravu L.J. and Sur S.N. Directory Compilation by computer. Ann Lib Sci Docum, 1967, 14(2), 89-101.

[4] Murty D.S.R. Coupling of Computer processed indexes to a photocomposing unit to improve the readability. Ann Lib Sci Docum, 1980, 27, 20-26.

[5] Neelameghan A. and Venkataraman S. Use of computer for the synthesis of class number: A case study with a freely faceted version of Colon Classification. Lib Sci Slant Docum, 1968, 5(4), 359-88.

[6] Neelameghan A. Computer simulation of some steps in classifying: Built-in features of a theory based scheme for classification (classification problems 66). Non-conventional methods in document retrieval. 15. Lib Sci Slant Docum, 1972, 9(4), 499-522.

[7] CAN/SDI. Profile Manual. Canada Institute for Science & Technology.

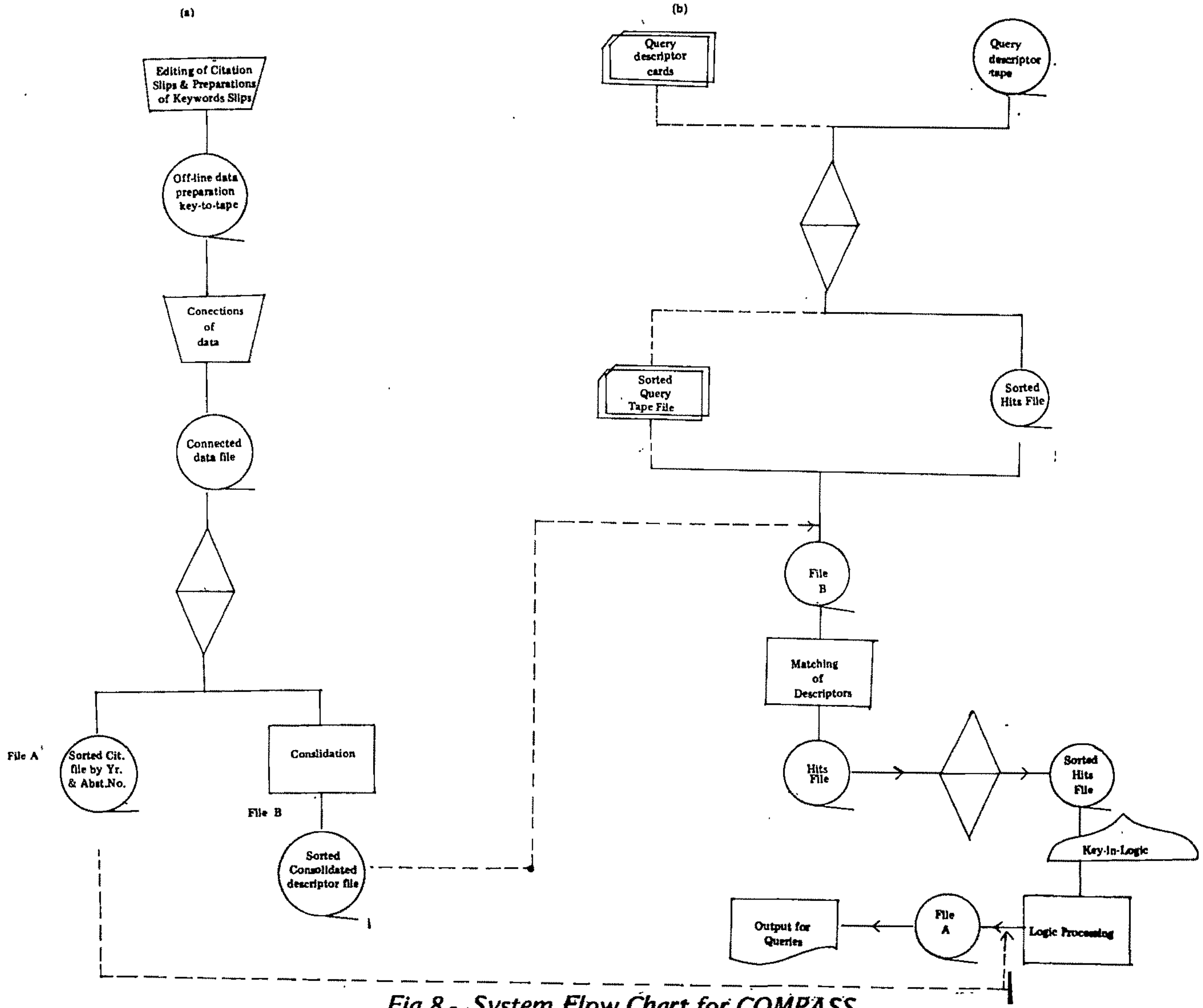
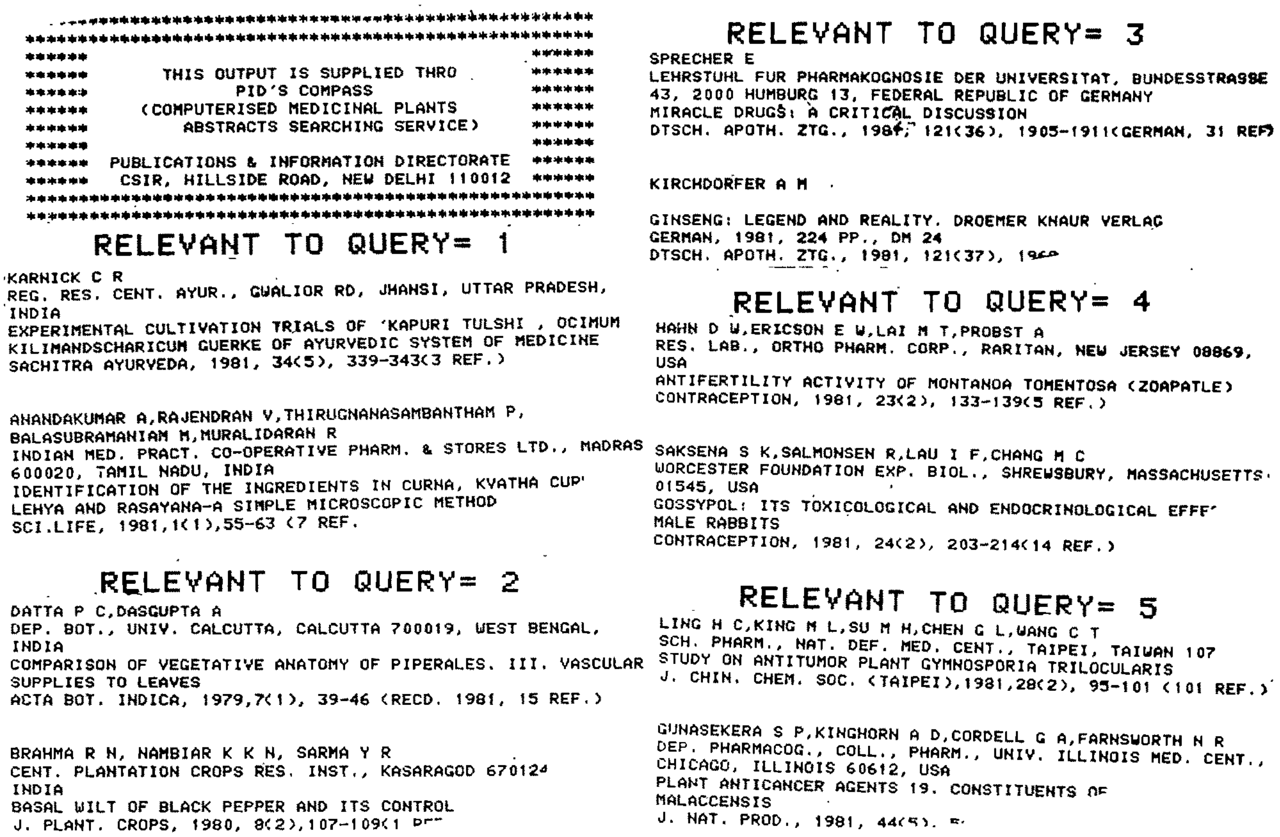


Fig.8 - System Flow Chart for COMPASS



```
**************************************************
**************************************************
******                                      ******
******       THIS OUTPUT IS SUPPLIED THRO   ******
******            PID'S COMPASS             ******
******    (COMPUTERISED MEDICINAL PLANTS    ******
******       ABSTRACTS SEARCHING SERVICE)   ******
******                                      ******
****** PUBLICATIONS & INFORMATION DIRECTORATE ******
******  CSIR, HILLSIDE ROAD, NEW DELHI 110012 ******
**************************************************
**************************************************
      RELEVANT TO QUERY= 1
KARNICK C R
REG. RES. CENT. AYUR., GWALIOR RD, JHANSI, UTTAR PRADESH,
INDIA
EXPERIMENTAL CULTIVATION TRIALS OF 'KAPURI TULSHI , OCIMUM
KILIMANDSCHARICUM GUERKE OF AYURVEDIC SYSTEM OF MEDICINE
SACHITRA AYURVEDA, 1981, 34(5), 339-343(3 REF.)


ANANDAKUMAR A,RAJENDRAN V,THIRUGNANASAMBANTHAM P,
BALASUBRAMANIAM M,MURALIDARAN R
INDIAN MED. PRACT. CO-OPERATIVE PHARM. & STORES LTD., MADRAS
600020, TAMIL NADU, INDIA
IDENTIFICATION OF THE INGREDIENTS IN CURNA, KVATHA CUP'
LEHYA AND RASAYANA-A SIMPLE MICROSCOPIC METHOD
SCI.LIFE, 1981,1(1),55-63 (7 REF.

      RELEVANT TO QUERY= 2
DATTA P C,DASGUPTA A
DEP. BOT., UNIV. CALCUTTA, CALCUTTA 700019, WEST BENGAL,
INDIA
COMPARISON OF VEGETATIVE ANATOMY OF PIPERALES. III. VASCULAR
SUPPLIES TO LEAVES
ACTA BOT. INDICA, 1979,7(1), 39-46 (RECD. 1981, 15 REF.)


BRAHMA R N, NAMBIAR K K N, SARMA Y R
CENT. PLANTATION CROPS RES. INST., KASARAGOD 670124
INDIA
BASAL WILT OF BLACK PEPPER AND ITS CONTROL
J. PLANT. CROPS, 1980, 8(2),107-109(1

      RELEVANT TO QUERY= 3
SPRECHER E
LEHRSTUHL FUR PHARMAKOGNOSIE DER UNIVERSITAT, BUNDESSTRASSE
43, 2000 HUMBURG 13, FEDERAL REPUBLIC OF GERMANY
MIRACLE DRUGS: A CRITICAL DISCUSSION
DTSCH. APOTH. ZTG., 1981, 121(36), 1905-1911(GERMAN, 31 REF)


KIRCHDORFER A M

GINSENG: LEGEND AND REALITY. DROEMER KHAUR VERLAG
GERMAN, 1981, 224 PP., DM 24
DTSCH. APOTH. ZTG., 1981, 121(37), 19

      RELEVANT TO QUERY= 4
HAHN D W,ERICSON E W,LAI M T,PROBST A
RES. LAB., ORTHO PHARM. CORP., RARITAN, NEW JERSEY 08869,
USA
ANTIFERTILITY ACTIVITY OF MONTANOA TOMENTOSA (ZOAPATLE)
CONTRACEPTION, 1981, 23(2), 133-139(5 REF.)


SAKSENA S K,SALMONSEN R,LAU I F,CHANG M C
WORCESTER FOUNDATION EXP. BIOL., SHREWSBURY, MASSACHUSETTS
01545, USA
GOSSYPOL: ITS TOXICOLOGICAL AND ENDOCRINOLOGICAL EFF
MALE RABBITS
CONTRACEPTION, 1981, 24(2), 203-214(14 REF.)

      RELEVANT TO QUERY= 5
LING H C,KING M L,SU M H,CHEN G L,WANG C T
SCH. PHARM., NAT. DEF. MED. CENT., TAIPEI, TAIWAN 107
STUDY ON ANTITUMOR PLANT GYMNOSPORIA TRILOCULARIS
J. CHIN. CHEM. SOC. (TAIPEI),1981,28(2), 95-101 (101 REF.)


GUNASEKERA S P,KINGHORN A D,CORDELL G A,FARNSWORTH N R
DEP. PHARMACOG., COLL., PHARM., UNIV. ILLINOIS MED. CENT.,
CHICAGO, ILLINOIS 60612, USA
PLANT ANTICANCER AGENTS 19. CONSTITUENTS OF
MALACCENSIS
J. NAT. PROD., 1981, 44(5),
```

Fig. 9. Extract of sample output from five test queries.

JOURNAL LITERATURE OF FOOD SCIENCE AND TECHNOLOGY : A BIBLIOMETRIC STUDY

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Analyses the references appended to three primary journals, one each from U.S.A., U.K., and India in the field of Food Science and Technology. Gives the main bibliographic forms used, a list of 62 core journals, their country of origin and the obsolescence. Bradford's law is applied to the literature of Food Science.

1 INTRODUCTION

Food Technology is a subject of inter-disciplinary nature. As a result the information is scattered over a large number of documents. In addition to this, there is a proliferation of literature due to accelerated research and development activities. Approximately 325 institutions/organizations are engaged in research in the field of Food Science and Technology all over the world[1]. Therefore, the availability of relevant information is an important requirement in carrying out research, effectively and efficiently.

A World Food Literature Survey conducted by Mann[2] showed that there were about 2,006 journals relevant to Food Science and Technology. The proliferation and also the volume of literature is also evident from the number of periodicals covered and the number of abstracts included in Food Science and Technology Abstracts. The number of periodicals increased from 1,000 in 1969 to 1,700 in 1981 and correspondingly the number of abstracts increased from 11,980 to 17,581.

From the above paragraphs, it can be inferred that, the scattering of information; the proliferation of journals and their rising costs are some problems that the libtrarians must be facing in the process of acquisition of scientific publications as well as the purchase of back volumes of periodicals. Hence, there is a need for studies which help in the judicious collection development in libraries.

2 OBJECTIVES

The objectives of the study are to determine:

(a) the main bibliographic forms;

(b) the core journals;

(c) the country of origin of the cited journals;

(d) the obsolescence rate of literature; and

(e) the applicability of Bradford's Law of Scattering to the Food Science Literature.

3 SOURCE JOURNALS

The three primary journals viz., JOURNAL OF FOOD SCIENCE (U.S.A.); JOURNAL OF FOOD SCIENCE AND TECHNOLOGY (INDIA); and JOURNAL OF FOOD TECHNOLOGY (U.K.) covering the period of six months from January-June 1980 have been scanned.

4 ANALYSIS

Table 1 gives the analysis of the source journals including volume numbers, issue numbers, and the year. These three journals contain 270 citing articles which have cited 4,570 documents with an overall average of 16.92 items per citing article.

Table 1: Distribution of Source Data

Sl. No.	Journal Title	Volume and issue Numbers	Year	Number of Citing Articles	Number of Cited Items	Average
1	J Food Sci	45(1-3)	1980	200	2,903	14.515
2.	J Food Sci Technol	17(1-3)	1980	37	1,153	31.162
3.	J Food Technol	15(1-3)	1980	33	514	15.575
	Total			270	4,570	16.925

Table 2: Form-wise distribution of cited literature

Sl. No.	Forms of Literature	Number of Citations	Percentage	Cumulative Number of Citations	Cumulative Percentage
1.	Periodicals	3,403	74.464	3,403	74.464
2.	Books	665	14.551	4,068	89.015
3.	Conference/Proceedings/ Workshops, etc.	220	4.814	4,288	93.829
4.	Reports (including Annual reports & Technical Reports)	91	1.991	4,379	95.829
5.	Theses/Dissertations	53	1.160	4,432	96.980
6.	Patents	41	0.897	4,473	97.877
7.	Preprints	42	0.919	4,515	98.796
8.	Standards	7	0.153	4,522	98.949
9.	Personal Communications	13	0.284	4,535	99.233
10.	Unpublished data	15	0.328	4,550	99.561
11.	Incomplete citations	20	0.437	4,570	99.998
	Total	4,570	99.998		

41 *Forms of Literature*

One of the objectives of the study was to identify the different bibliographic forms of the literature used by the Food Scientists. Table 2 gives the different bibliographic forms of the cited literature. It reveals that 74.46% of the total citations account for periodicals only. Books are the second largest source of information (14.55%). In other words, periodicals and books together meet 89.01% of the total information needs. The remaining 10.98% of the documents are in the form of conference proceedings, reports, theses/dissertations, patents, preprints, standards and personal communications. From this, it is clear that the most frequently used of all the sources of information are periodicals, strengthening the already established universal belief concerning the literature use habits of scientists.

42 *Rank list of Journals*

After confirming that primary journals form the major source (74.5%) of information, it is desirable to carry out further analysis and studies of journals. The frequency with which a journal is cited is considered to be a measure of its productivity. Hence, journals cited not less than ten times, whose number comes to 62, are listed in Table 3.

In the rank list the 'JOURNAL OF FOOD SCIENCE' scores the highest (14.546%). 'FOOD TECHNOLOGY' is the second in the rank list being cited 193 times (5.671%). The third and fourth ranks go to the journals 'J FOOD SCI TECHNOL, and J AGRIC FOOD CHEM'. From the table it is clear that the credit of publishing more number of top journals goes to U.S.A.

Table 3: Ranking List of Journals

Sl. No.	Rank No.	Journal Title	Country	Number of citations	Cumulative Number of Citations	Percentage	Cumulative Percentage
1.	1	J Food Sci	U.S.A.	495	495	14.546	14.546
2.	2	Food Technol	U.S.A.	193	688	5.671	20.217
3.	3	J Food Sci Technol	India	127	815	3.732	23.949
4.	4	J Agric Food Chem	U.S.A.	125	940	3.673	27.622
5.	5	J Sci Food Agric	U.K.	94	1,034	2.762	30.384
6.	6	J Food Technol	U.K.	87	1,121	2.557	32.941
7.	7	Cereal Chem	U.S.A.	80	1,201	2.350	35.291
8.	8	J AOAC	U.S.A.	71	1,272	2.086	37.377
9.	9	Food Sci	India	70	1,342	2.057	39.434
10.	10	J Am Oil Chem Soc	U.S.A.	69	1,411	2.027	41,461
11.	11	J Chromatogr	Netherlands	64	1,475	1.880	43.341
12.	12	J Biol Chem	U.S.A.	63	1,538	1.851	45.192
13.	13	Indian Food Packer	India	59	1,597	1.733	46.925
14.	14	J Sci Ind Res	India	51	1,648	1.498	48.423
15.	15	J Food Prot	U.S.A.	50	1,698	1.469	49.842
16.	16	Appl Microbiol	U.S.A.	49	1,747	1.440	51.332
17.	17	J Anim Sci	U.S.A.	42	1,789	1.234	52.566

18.	18	J Dairy Sci	U.S.A.	39	1,829	1.146	53.712
19.	19	J Nutr	U.S.A.	35	1,863	1.038	54.740
20.	20	J Appl Bacteriol	U.K.	34	1,897	0.999	55.739
21.	20	Phyto chemistry	U.K.	34	1,931	0.999	56.738
22.	21	Poult Sci	U.S.A.	32	1,963	0.940	57.678
23.	22	Biochem Biophys Acta	U.S.A.	31	1,994	0.910	58.588
24.	23	Aust J Dairy Technol	Australia	19	2,023	0.952	59.440
25.	24	Agri Biol Chem	Japan	26	2,049	0.764	60.204
26.	24	Appl Environ Microbiol	U.S.A.	26	2,075	0.764	61.962
27.	25	J Bacteriol	U.S.A.	25	2,100	0.734	61.702
28.	26	Nature (Lond)	U.K.	24	2,124	0.705	62.407
29.	27	Biochem J	U.K.	23	2,147	0.675	63.082
30.	28	Am J Clin Nutr	U.S.A.	22	2,169	0.646	63.728
31.	28	Anal Biochem	U.S.A.	22	2,191	0.646	64.374
32.	29	J Am Diet Assoc	U.S.A.	21	2,212	0.617	64.991
33.	30	Indian J Ntr Diet	Indian	20	2,232	0.587	65.578
34.	30	Amer Chem Soc J	U.S.A.	20	2,252	0.587	66.165
35.	30	Science	U.S.A.	20	2,272	0.587	66.752
36.	31	Analyst Chem	U.S.A.	19	2,291	0.558	67.310
37.	32	Can Inst Food Technol	Canada	18	2,309	0.529	67.839
38.	32	Food Prod Der	U.S.A.	18	2,327	0.529	68.368
39.	33	Biochemistry	U.S.A.	17	2,344	0.499	68.867
40.	34	J Text Stud	U.S.A.	16	2,360	0.470	69.337
41.	34	Lebensm-Wiss u Technol Switzer	Switzerland	16	2,376	0.470	69.807
42.	34	Plant Physiol	U.S.A.	16	2,392	0.470	70.277
43.	35	Arch Biochem Biophys	U.S.A.	15	2,407	0.440	70.717
44.	35	Cereal Food World	U.S.A.	15	2,422	0.440	71.157
45.	35	Res Ind	India	15	2,437	0.440	71.697

46.	35	Z Lebensm Unters Forsch	Germany	15	2,452	0.440	72.037
47.	36	Baker's Digest	U.S.A.	14	2,466	0.411	72.448
48.	36	Flavoured Ind I	U.K.	14	2,480	0.411	72,859
49.	36	J Chromatogr Sci	U.S.A.	14	2,494	0.411	73.270
50.	37	Curr Sci	India	13	2,507	0.382	73.652
51.	37	Experientia	U.S.A.	13	2,520	0.382	74.034
52.	37	J Cell Biol	U.S.A.	13	2,533	0.382	74.416
53.	37	J Phys Chem	U.S.A.	13	2,556	0.382	74.798
54.	37	Nature (Paris)	France	13	2,559	0.382	75.180
55.	38	Anal Chem	U.S.A.	12	2,571	0.352	75.532
56.	38	NZJ Agric Res	New Zealand	12	2,583	0.352	75.884
57.	38	Proc Indian Acad Sci	India	12	2,595	0.352	76.236
58.	39	J Pathol	U.K.	11	2,606	0.323	76.559
59.	39	Nutr Rep Int	U.S.A.	11	2,617	0.323	76.882
60.	40	Fish Technol	India	10	2,627	0.295	77.177
61.	40	Indian Coffee	India	10	2,637	0.295	77.472
62.	40	J Oil Technol Agric India	India	10	2,647	0.295	77.767
62		Total		2,647	2,647	77.767	77.767
304		Other Titles (each having citations less than Ten		756	756	22.233	22.233
366		Grand Total		3,403	3,403	100.000	100.000

43 *Productivity of Cited Journals*

In order to measure the productivity of journals, the total of 3,403 citations referring to 366 journals are divided into four equal groups of 850.5 citations each. The number of cited journals, their productivity in each group is given in Table 4. It can be seen from the table that 25% of the citations are to the first four journals of the rank list, thus signifying their high rate of productivity. The average productivity of each journal in the first group was 235 articles, whereas it has come down to 2.74 articles in the fourth group. This marked difference confirms the decreasing productivity of individual journals in the rank list.

It can be inferred that a library subscribing to 53 journals belonging to the first three categories can meet 75% of the information needs as far as periodical literature is concerned.

Table 4: Productivity of Cited Journals

Sl. No.	Categories	No. of Journals covered	Percentage	Average Productivity of each Journal
1.	I	4	1.0928	235.000
2.	II	11	3.0054	68.909
3.	III	38	10.3825	22.3157
4.	IV	313	85.5191	2.7380
	Total	366	99.9998	

Table 5: Citations and Self Citations to Source Journals

Source Journal	Total No. of Journal citations received	Total No. of self citations	Percentage of self citations
J Food Sci	2,144	431	20.10
J Food Sci Technol	849	122	14.36
J Food Technol	410	36	8.78
Total	3,403	589	17.30

44 *Citations and Self citations to Source Journals*

Table 5 provides an analysis of the total number of journal citations collected from source journals and their number of self-citations. It is clear from the table that the self-citing rate of the three journals is in the decreasing order according to their ranking. The self-citing rates of the three journals are 20.10%, 14.36% and 8.78% respectively.

45 *Geographical distribution of cited Journals*

Table 6 represents the country of origin of the journals used by Food Scientists. Citations themselves could not provide the names of the countries from which the journals originated. The required information has been collected from Ulrich's International Periodicals Directory (Ed.18; 1979-80), World List of Scientific Periodicals (Ed. 4; 1964), Serial Sources for BIOSIS data base (1981) and the 'Bibliography' of Periodical Holdings of the C.F.T.R.I. Library (1976).

It is clear from the table that nearly 38.52% of the journals cited emerge from U.S.A., whereas India and U.K. are the next two coun-

Table 6: Geographical Distribution of Cited Journals

Sl. No.	Country of Publication	Number of Titles	Percentage	Cumulative Percentage
1.	USA	141	38.52	38.52
2.	India	73	19.95	58.47
3.	UK	55	15.03	73.50
4.	Japan	21	5.74	79.24
5.	Germany	13	3.55	82.79
6.	Canada	9	2.46	85.25
7.	France	6	1.64	86.89
8.	Netherlands	6	1.64	88.53
9.	Australia	5	1.37	89.90
10.	Czechoslovakia	5	1.37	91.27
11.	Denmark	5	1.37	92.64
12.	Switzerland	4	1.09	93.73
13.	Italy	3	0.82	94.55
14.	New Zealand	3	0.82	95.37
15.	Taiwan	3	0.82	96.19
16.	Austria	1	0.27	96.46
17.	Brazil	1	0.27	96.73
18.	Geneva	1	0.27	97.00
19.	Ghana	1	0.27	97.27
20.	Greece	1	0.27	97.54
21.	Hungary	1	0.27	97.81
22.	Ireland	1	0.27	98.08
23.	Pakistan	1	0.27	98.35
24.	Philippines	1	0.27	98.62
25.	Scotland	1	0.27	98.89
26.	UN	1	0.27	99.16
27.	USSR	1	0.27	99.43
28.	Yugoslavia	1	0.27	99.70
29.	Zambia	1	0.27	99.97
	Total	366	99.97	

tries each contributing 19.95% and 15.03% of journals respectively, thus 73.5% journals cited are from these three countries only. The remaining 26.5% of the journals originate from as many as 26 countries.

46 *Obsolescence of Food Science Literature*

To find out the obsolescence rate of Food Science literature, 3,403 journal citations were tabulated into 17 quinquennia in Table 7.

Graph 1 was plotted taking years on the X-axis and the cumulative total of citations from periodicals on the Y-axis. To find out the half life period a line parallel to the X-axis was drawn from the point-D to meet the curve at B. 'D' represents half of the total citations i.e., 1,701.5. When a perpendicular line is drawn from the point B to meet the X-axis at C, wherein OC represents half life of the Food Science literature, which is 7 years.

47 *Bradford's Law of Scattering and Food Science Literature*

The data obtained in the study have been tested applying the Law of Scattering. Accordingly, Graph 2 was plotted taking cummulated sum of articles R(n) on the ordinate X-axis versus the logarithm of the cumulated sum of journals on the Y-axis. An initially rising and

Table 7: Distribution of Journal Citations and Quinquennia Periods

Periods	Citations	Percentage	Cumulative Percentage of Citations
1-5	1,184	34.79	1,184
6-10	810	23.80	1,994
11-15	500	14.69	2,494
16-20	364	10.69	2,858
21-25	234	6.87	3,092
26-30	139	4.08	3,231
31-35	52	1.52	3,283
36-40	37	1.08	3,320
41-45	21	0.61	3,341
46-50	32	0.94	3,373
51-55	8	0.23	3,381
56-60	8	0.23	3,389
61-65	3	0.08	3,392
66-70	3	0.08	3,395
71-75	5	0.11	3,399
76-80	0	0.00	3,399
81-85	4	0.11	3,403
Total	3,403	99.91	

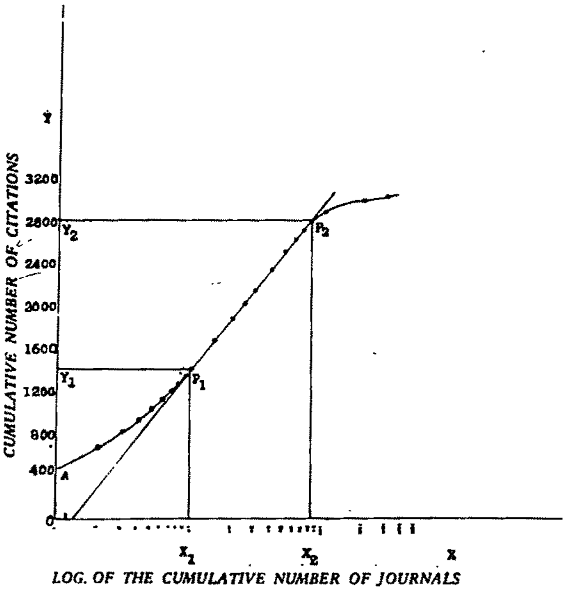
then turning into a linear curve was obtained. It is in accordance with Bradford's hyperbolic curve, signifying the developed nature of the subject.

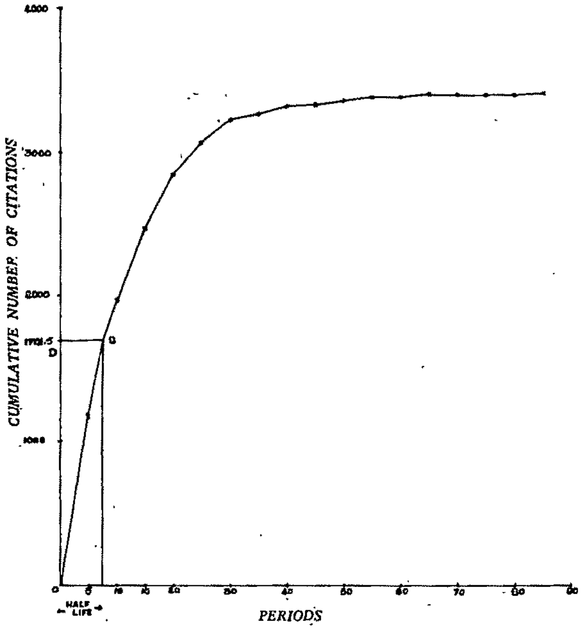
References

[1] Central Food Technological Research Institute. Directory of Institutional sources in food science and technology, Mysore, 1980.

[2] Manon, E.J. Report on international survey of world literature on food science and technology. Dairy Science Abstracts 1966, 28(12), 603-606.

BRADFORD'S BIBLIOGRAPH





PRESS CLIPPING SERVICE AND ITS IMPORTANCE IN AGRICULTURAL RESEARCH LIBRARY

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Describes the importance of Press Cutting Service in an agricultural research library. Also deals with the procedure of selecting news release from six leading newspapers of India and their systematic arrangement as per Dewey Decimal Classification Scheme. Suggests for introducing the service in all special libraries.

1. INTRODUCTION

Information is the fifth need of man ranking after air, water, food and shelter[1] The information in a specific field of knowledge may be disseminated to the needy with the help of any media both micro- and macro- in any form both conventional such as newspapers, periodicals, books, etc. and nonconventional such as microfilms, micro-cards, microfiche, computer tapes, film-rolls, etc. The value of information is time-bound. Information loses its value with the passing of time. No doubt newspaper gives information in any field of knowledge, even if the information is in embryo-stage, in a form which can be understood by people in all walks of life. That is why newspapers may be considered as popular mass media. As the universe of information is ever growing in many dimensions any standard newspaper can not cover all information at a time. In the present study an endeavour is made to scan information only in agriculture and allied fields to cater to the needs of agricultural scientists.

2. MATERIAL

Agricultural scientists in different fields such as Agronomy, Plant Breeding, Plant Diseases, Horticulture, Livestock Production, Health, Nutrition, etc. were consulted individually and their needs in respective fields were assessed pinpointedly so as to collect the important and relevant press releases. To make the endeavour effective, questionnaires consisting of five questions were circulated among agricultural scientists from S to S3-level doing research in Head Quarters located in Shillong (Meghalaya). Out of 50 (fifty) questionnaires circulated among them, 30 (thirty) were received in time. On analysing their answers it was concluded that a systematic Press Cutting Service would be very useful.

With a view to cover maximum news releases both from Indian and Foreign origin, six leading newspapers of India, namely, (i) Amrita Bazar Patrika (Calcutta), (ii) Assam Tribune (Gauhati), (iii) Economic Times (Calcutta), (iv) News Star (Gauhati), (v) Statesman (Calcutta) and (vi) Times of India (New Delhi) were selected as sources of all discursive and non-discursive information at any stage of their development[2].

3. METHOD

All the six selected newspapers were being scanned daily for half an hour from 10 to 10-30 a.m. The selected items were marked and sent to the Technical Section. The Technical Staff fixed for the purpose would cut out the items without damaging the whole newspaper and paste them on sheets of thick papers. The classifier classified the news releases as per Dewey Decimal Classification Scheme. To maintain uniformity in size, shape, etc., one stencil for each newspaper was cut mentioning on the top of it the title of newspaper, place of publication, date of publication and broad Dewey Decimal Class Number. Duplicating papers used were of same size. The size of each duplicating paper, space for typed items, space for pasted material etc. are shown in Figure 1.

FIGURE NO. 1.

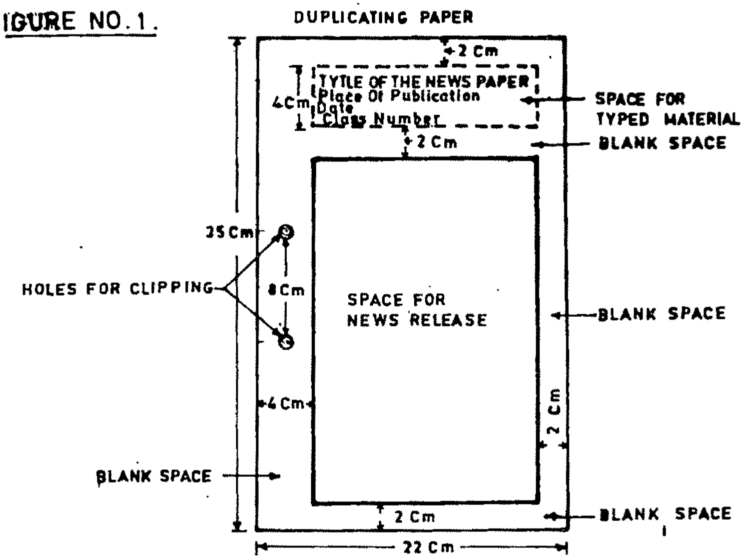
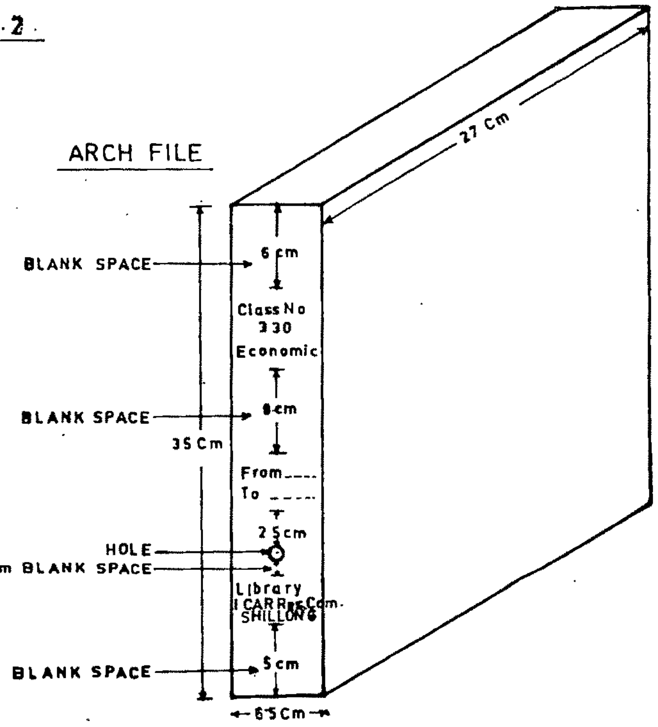


TABLE NO 1.

300-SOCIAL SCIENCES
330-ECONOMICS
630-AGRICULTRE AND RELATED TECHNOLOGIES
631-GENERAL AGRICULTURAL TECHNIQUES, APPARATUS, EQUIPMENT, MATERIALS.
632-PLANT INJURIES DISEASES PESTS
633-FIELD CROPS
634 - ORCHARDS FRUITS FORESTRY
635 - GARDEN CROPS (HORTICULTURE) VEGETABLES
636 - ANIMAL HUSBANDRY
637 - DAIRY AND RELATED TECHNOLOGIES
638 - INSECT CULTURE
639 - NON DOMESTICATED ANIMALS AND PLANTS

FIGURE NO. 2.



For the proper maintenance and systematic arrangement of clippings, similar type of "Arch-Files" having punch-clipping facilities were used. Selected news releases were restricted to 12 (twelve) broad classes as per DDC Scheme. Details are shown in Table Number 1. One Arch File was fixed for one Class Number which was written on the top of the spine with the name of the respective subject class. In the middle of each spine, date, month and year of origin were clearly written. At the bottom, name of the library and full address of the institute in capital letters were written. These are illustrated in Figure 2. Clippings bearing the class number were arranged in one Arch-File chronologically. All the Arch-Files were arranged as per Class Numbers and were kept in the "Popular Reading Circle".

4. DISCUSSION

The whole gamut of activities concerned with Press Cutting Service included techniques of information dissemination and communication and the whole range of activities centred around promotion and utilization of news releases in an effective way. As the scientists were aware of the Press Cutting Service rendered by the Library, whenever they visited the library they first went through clippings pertaining to their field of interests. On many occasions they would note down relevant information in their field diary. It was observed that they sometime discussed among themselves on some points outside the reading room. They demanded photo copies for some of the controversial news releases. As time passed the demand for Press Cutting Service increased by leaps and bounds. Not only the scientists of the Institute were benefitted but also the readers coming from other institutes were also using the clippings with utmost interest. Some of the users suggested that clippings in political developments in and outside India, strategic importance of the Indian Ocean, and space research and its different stages of development might be maintained alongwith other clippings.

5. CONCLUSION

The Press Cutting Service in any special library plays a vital role like Selective Dissemination of Information (SDI), Current Contents Service, Book Alert Service, etc. The outcome of the service conclusively indicates that there is a need for introducing this service in special library of any area of knowledge. The person selected for the job must have thorough knowledge about the needs of the information uses. He should not select such news releases which may create unnecessary noise among the useful clippings and destroy the very objective of the service. Though the users are very limited yet any special library should introduce this service along with other services.

6. ACKNOWLEDGEMENT

The author is indebted to the scientists of ICAR Research Compex for N.E.H. Region, Shillong (Meghalaya) for their initiation. He is also thankful to the Director of the Institute for his kind permission in forwarding the communication for publication.

7. REFERENCES

[1] Kemp, D.A.: The nature of knowledge, an introduction for librarian. London, Clive Bingley, 1976.

[2] Bhattacharyya, G.: Information sciences, a unified view through a systems approach. Calcutta, Indian Association of Special Libraries and Information Centres, 1978.

COMPILATION OF RETROSPECTIVE BIBLIOGRAPHY BY CITATION MAPPING

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The technique of compiling retrospective bibliographies by citation mapping is a process of constructing relational maps by linking citations from the current publications to the archival contributions. The recall and precision of the bibliography is contended to be satisfactory and could be improved by rational choice of base articles and link articles. The technique is demonstrated by compiling a bibliography on 'Bradford's law of scatter'. The author believes that the technique should be useful in compiling bibliographies on micro-subjects.

OBJECTIVE

The compilation of retrospective bibliographies by citation linkages, that is, the relational maps formed by proceeding from citations of current papers as base and following the citation links onwards by choosing the latest and relevant reference(s) at each level as the link and so on, is demonstrated to be valid and valuable means of compiling accurate bibliographical tracing of the subject. It is surmised that the citation mapping gives an account of the discovery and the major developments in a field. The technique is projected to increase the recall and precision of the bibliography, though is restricted by the inherent bias in citations. Inquiries into the literature search methods of scientists have shown that they tend to approach the literature of their subject in a similar way.

The technique has been used to compile a bibliography on 'Bradford's law of scatter' and the findings are discussed. It is observed that the precision of the bibliography is of high order and the recall could be improved by increasing the number of base articles by a careful choice of their authors from different countries, different languages and from different journals. Such a rational choice of base articles would eliminate some of the bias in citations. The effectiveness of the technique is likely to be more encouraging in the case of hard sciences.

COMPILATION OF SUBJECT BIBLIOGRAPHIES

A bibliographer knows that subject fields have become narrower and narrower with increasing specialization in research. This has inevitably left the bibliographer to face a honorous task of selecting 'relevant' documents without sacrificing 'recall' from the heaps of literature produced. It is as tedious an exercise as the proverbial searching for a 'hair-pin' in hay-stack.

The rapid strides made in automation and computer techniques in the last two decades have had their effect on bibliographies; from the mechanization of tedious tasks of cumulating entires and of producing keyword indexes to the intricate programming for computerised information retrieval. Use of a number of available mechanised information system shows that their success is 'hit' and 'miss' affair. When the subject expression is long and complicated and has to retrieve documents in the subject, tracing back to the first few publications, many of the existing data bases do not reach to the requirement. Also, the shortcomings in the index and intricate search expressions fail to improve the precision and recall without sacrificing one for the other. In such situations it has been envisaged that the technique of 'citation mapping' could be tried, though it has its own inherent limitations.

CITATION MAPPING

Citation mapping is the procedure of linking highly relevant citations starting from few current base articles in the subject and proceeding on choosing the highly relevant and latest references down to the first few preliminary publications in the subject. In other words, they are the relational maps by following the citations to link present knowledge to the archival contributions.

It has been observed that an article published at a point of time takes two to three years to be cited. Thus the most relevant articles during this period form the base articles (Level-0). The relevant references in each of these articles are chosen by the process of elimination rather than selection (a few references might have been cited which are out of the scope of the subject of the bibliography for various reasons). Among these references the latest and highly relevant references form the link articles and this process is continued until we track the first few articles in the subject.

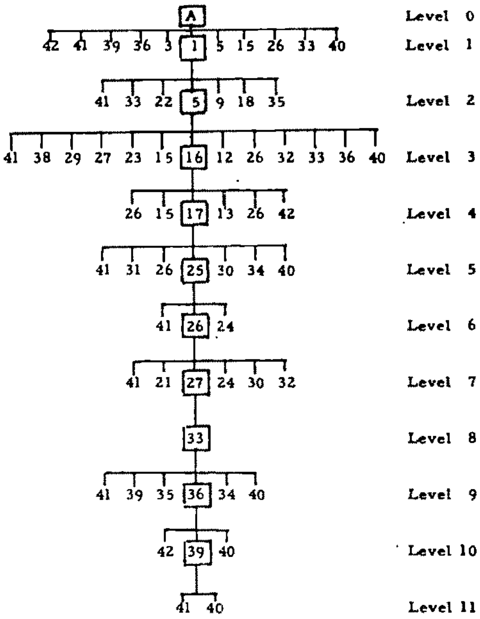
Single Mapping: In single mapping only one relevant and latest reference is chosen as link article at each level of the mapping as in Fig.1. The recall of the bibliography retrieved may not be impressive unless a number of base articles are mapped. Still, if the time period between cited and citing references at each level is long, the recall may not be to the required level. This lacuna is overcome by resorting to Multiple Mapping.

Multiple Mapping: In multiple mapping, more than one relevant references are chosen as link articles at each level of the mapping, and there by, branching off the mapping at all levels. This would eliminate some of the irregularities in citing of documents arising out of lack of awareness of authors in systematic tracking of the developments in the subject.

The set of citations, thus mapped, should ensure a high order of precision and recall. Also, a consolatory advantage in citation mapping is that it gives a fair idea of the importance of each reference by the number of times it is cited in the mapping. However, it falls short of an exact ranked list as the number of times a reference is cited is time dependant.

FIG. I

CITATION MAPPING OF ARTICLE 'A'



Note: Numbers & letters correspond to the references in Appendix I & Appendix 2.

This technique has potential advantage over other methods when the subject of the retrospective bibliography is concerned to theories, laws, experiment, instrument design and aspects which have sustematic developmental stages over time. To make the technique more vivid, it is exemplified by compiling a bibliography on 'Bradford's law of Scatter'.

BIBLIOGRAPHY OF BRADFORD'S LAW OF SCATTER

Bradford, S.C.[1] had published his first article on the scatter of the literature of a subject in 1934 and after two decades, the subject has gained importance and is used as an index term in the LISA and Library Literature. In the past two decades about fifty articles have been published on the subject.

To compile a bibliography on this topic by scanning LISA or Library Literature for over two decades is tedious and time consuming. Further, the articles published before 1960 cannot be easily retrived as the term is not indexed in these secondary sources. The first few articles in a subject are of greater importance to review the literature published on the subject. In such a situation the citation mapping is demonstrated to have the potential for bibliographical tracing of the subject.

In the present case study of compiling a bibliography on Bradford's law of scatter, five base articles by different authors published in four different journals have been chosen. The base articles were all in English. The list of the base articles is given in Appendix-1.

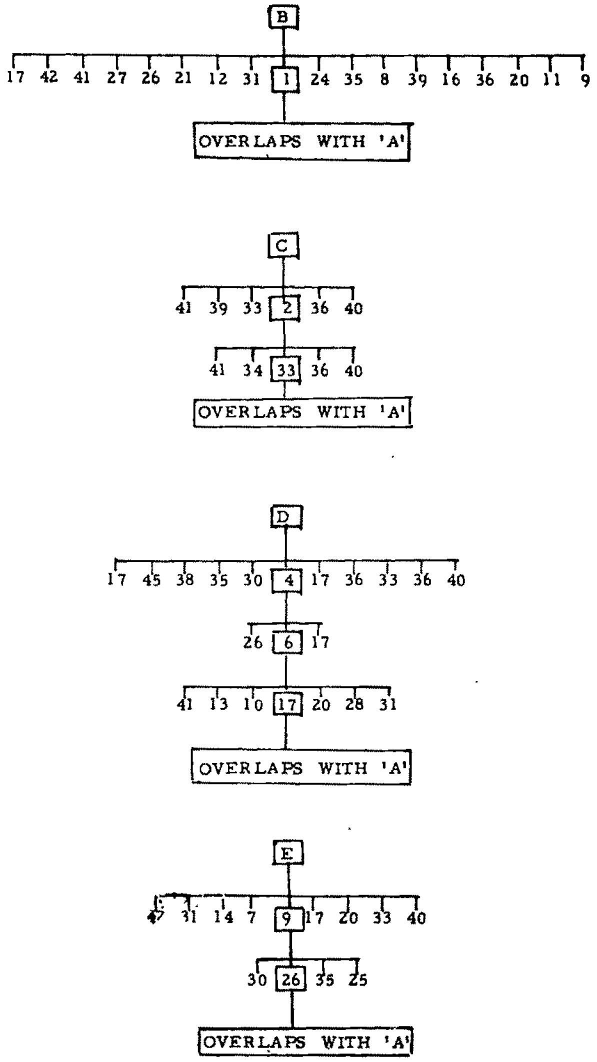
The mapping of article 'A' in Appendix-1 is shown in Fig.1. The link article at each level is a judicious choice based on currency and relevance and are indicated by enclosing in a square. The numbers correspond to the references listed in the bibliography given in Appendix-2. The mapping involves ten link articles of which the originals have to be checked for references. The mapping has retrieved 30 references, the precision of which is found to be of very high order. The recall is more than 60% and gives the tracing of the subject to its origin.

The recall is increased by mapping four more articles, terminating the mapping with coincidence of the link article as shown in Fig.2. This has resulted in the increase of recall by 20% by adding 12 more references to the bibliography. The recall could be further improved by choosing more than one link article at each level i.e. by Multiple Mapping and is effective when the time gap between citing and cited references down the levels is large.

The bibliography as given in Appendix-2 is of high precision and recall, and retrieved all the important publications which are land marks in the development of the subject from its origin. It is conjectured that the yield of the bibliography would be more in the case of hard sciences bearing out the fact that the bias in citations is less prominent.

FIG. 2

CITATION MAPPING OF 'B', 'C', 'D' & 'E'



Note: Numbers & letters correspond to references in Appendix 1 and Appendix 2.

LIMITATION OF CITATION MAPPING

Although the technique of citation mapping for bibliographical tracing of a subject is quite promising, it is limited by the requirement of obtaining the originals of base and link articles. This imposes that the bibliographer should have access to a wide range of source documents on the subject. Thus, the technique is viable in centres, where rich collection in their respective subjects are available.

CONCLUSION

Citation mapping is demonstrated to be a promising technique to trace the subject literature right upto the first few published contributions in the subject. Such chronologically arranged bibliographies would serve as foundation for researchers to acquaint them with the developments in the subject. In information analysis centres, this forms the basis to bring out products like Reviews, State-of-the-Art Reports etc., on a subject.

REFERENCES

[1] Bradford, S.C. Sources of information on specific subjects. Engineering, 1934, 137, 85-86.

APPENDIX - 1

BASE ARTICLES

(A) Drott, C.M. Bradford's Law: Theory, empiricism and the gaps between. Lib Trends, 1981, 30, 41-52.

(B) Asai, I. A general formulation of Bradford distribution: The graph-oriented approach. J Amer Soc Inf Sci.

(C) Morse, P.M. Implication of the exact Bradford distribution. J Amer Soc Inf Sci, 1981, 32, 43-50.

(D) Cline, G.S. Application of Bradford's law to citation data. Coll Res Librs, 1981, 42, 53-61.

(E) Avramescu, A. Theoretical foundation of Bradford's law. Int Forum Inf Docum, 1980, 5, 15-22.

APPENDIX - 2

BIBLIOGRAPHY OF BRADFORD'S LAW OF SCATTER

*1. Drott, M.C. and others. Bradford's law and libraries: Present applications Potential promise. Aslib Proc, 1979, 31, 196-204.

*2. Morse, P.M. and Leimkuhler, F.F. Exact solution for the Bradford's distribution and its use in modeling informational data. Oper Res, 1979, 27, 187-98.

3. Brookes, B.C. and Griffith, J.M. Frequency-rank distributions. J Amer Soc Inf Sci, 1978, 29, 5-14.

*4. Praunlich, P. and Kroll, M. Bradford's distribution: a new formulation. J Amer Soc Inf Sci, 1978, 29, 51-55.

*5. Drott, M.C. and Griffith, B.C. An emperical examination of Bradford's law and scattering of scientific literature. J Amer Soc Inf Sci, 1978, 29, 238-46.

*6. Brookes, B.C. Theory of the Bradford's law. J Docum, 1977, 33, 180-209.

7. Bookstein, A. Patterns of scientific productivity and social change: a discussion of Lotka's law and bibliometric symmetry. J Amer Soc Inf Sci, 1977, 28, 206-10.

8. Haspers, J.H. The yield formula and Bradford's law. J Amer Soc Inf Sci, 1976, 27, 282-87.

*9. Price, D.S. A general theory of bibliometric and other cumulative advantage processes. J Amer Soc Inf Sci, 1976, 27, 292-306.

10. Brookes, B.C. A sampling theorem for infinite discrete distributions. J. Docum, 1975, 31, 26-35.

11. Pope, A. Bradford's law and the periodical literature of information science. J Amer Soc Inf Sci, 1975, 26, 207-13.

12. Freeman, C. Bradford's bibliographs and the literature of Marine science. Austln Acad Res Librs, 1974, 5, 65-71.

13. Brookes, B.C. Numerical methods of bibliographic analysis. Lib Trends, 1973, 22, 18-43.

14. Avramescu, A. Contribution to the foundation of bibliometric laws. Stud Cercet Docum, 1973, 15, 3-19.

15. Lawani, S.M. The periodical literature of tropical and subtropical agriculture. Unesco Bull Librs, 1972, 26, 88-93.

*16. Lawani, S.M. Bradford's law and the literature of agriculture. Int Lib Rev, 1972, 5, 88-93.

*17. Wilkinson, E.A. The ambiguity of Bradford's law. J Docum, 1972, 28, 122-30.

18. Buckland, M.K. Are obsolescence and scattering related? J Docum, 1972, 28, 242-45.

19. Brookes, B.C. Optimum p% library of scientific periodicals. Nature, 1971, 232, 458-61.

20. Naranan, S. Power law relations in science bibliography - a self-consistant interpretation. J Docum, 1971, 27, 83-97.

21. Brookes, B.C. Photocopies vs periodicals: cost-effectiveness in the special library. J Docum, 1970, 26, 22-29.

22. Brookes, B.C. Viability of branch libraries. J Librnship, 1970, 2, 14-21.

23. Goffman, W. and Morris, T.G. Bradford's law and library acquisitions.Nature, 1970, 226, 922-23.

24. Goffman, W. and Morris, T.G. Bradford's law applied to the maintenance of library collections. In Introduction of Information sciences; edited by Tefko Saracevic. New York, Bowker, 1970, pp.200-203.

*25. Naranan, S. Bradford's law of bibliography of science: an interpretation. Nature, 1970, 227, 631-32.

*26. Brookes, B.C. Bradford's law and the Bibliography of Science. Nature, 1969, 224, 953-56.

*27. Brookes, B.C. The complete Bradford-Zipf 'Bibliograph'. J Docum, 1969, 25, 58-60.

28. Buckland, M.K. and Hindle, A. Library Zipf. J Docum, 1969, 25, 52-57.

29. East, H. and Weyman, A. A study in the source literature of Plasma Physics. Aslib Proc, 1969, 21. 160-71.

30. Fairthorne, R.A. Emperical hyperbolic distribution (Bradford-Zipf-Mandelbrot) for bibliometric description and prediction. J Docum, 1969, 25, 319-43.

31. Goffman, W. and Warren, K.S. Dispersion of papers among journals based on mathematical analysis of two diverse medical literatures. Nature, 1969, 221, 1205-07.

32. Wood, D.N. and Bower, C.A. Use of science periodical literature. J Docum, 1969, 25, 108-22.

*33. Brookes, B.C. The derivation and application of the Bradford-Zipf distribution. J Docum, 1968, 24, 247-65.

34. Leimkuhler, F.F. A literature search and file organisation model. Amer Docum, 1968, 19, 131-36.

35. Groos, O.V. Bradford's law and the Keenan-Atherton data. Amer Docum, 1967, 18, 46.

*36. Leimkuhler, F.F. The Bradford distribution. J Docum, 1967, 23, 197-207.

37. Cole, P.F. Journal usage versus age of the journal. J Docum, 1963, 19, 1-11.

38. Cole, P.F. A new look at reference scattering. J Docum, 1962, 18, 58-64.

*39. Kendall, M.G. The bibliography of operational research. Oper Res Qrtly, 1960, 11, 31-36.

40. Vickery, B.C. Bradford's law of scattering. J Docum, 1948, 4, 198-203.

41. Bradford, S.C. Documentation. London, Crossby Lockwood. 1948.

42. Bradford, S.C. Sources of information on specific subjects. Engng 1934, 137, 85-86.

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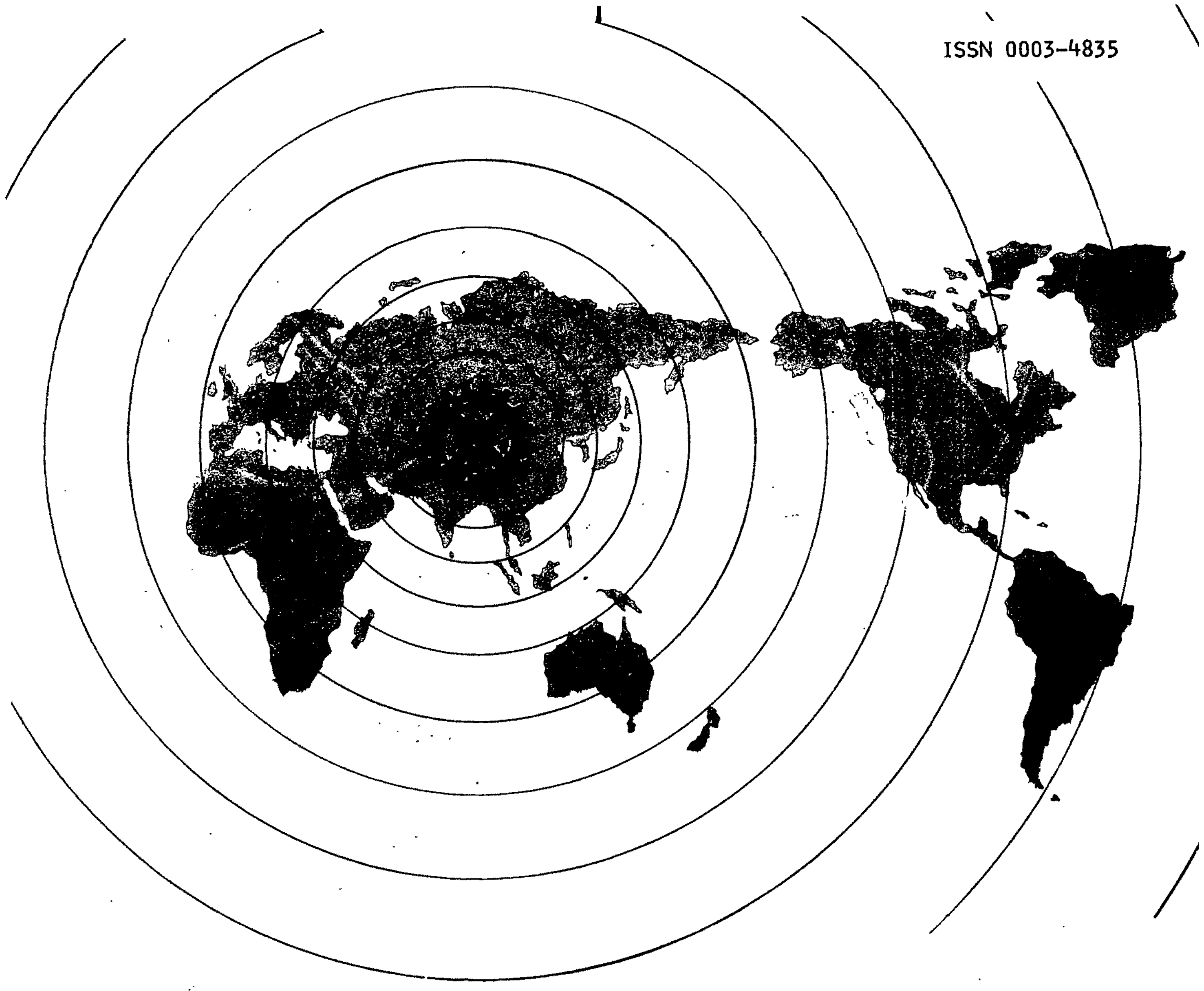

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CHINA: A LATE STARTER IN MODERN INFORMATION SCIENCE

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A recent first-hand account of China's major institutions in science and technology, information centres, and libraries is presented. The progress of these institutions after liberation and the programmes before them are highlighted. With the present rate of progress, China is likely to face an information explosion within a decade.

1. INTRODUCTION

Development of science and technology, social sciences, arts and culture, for that matter, any subject of learning, in a country depends on the availability of information and its proper utilization. China is no exception to this rule.

Being one of the oldest civilizations on earth, China rightly boasts of its heritage in the field of learning. The centuries old manuscripts and other literary wealth preserved in the nation's archives show the extent and vastness of scholarship the country had produced in its past. But during the last several decades, achievements in this field are not very impressive by standards set by Western countries. One may attribute historical and political reasons to this lacklustre performance.

Decades of civil war and years of world war in the first half of this century posed enormous hurdles for the development of learning and scholarship. During the past 33 years of Communist administration, intellectual activities and independent thinking – two factors vital for the growth of learning and scholarship – had fallen victims to the whims of the policy makers more than once.

In the mid-fifties, it was the demise of the much-heralded "Let hundred flowers blossom"; mid-sixties witnessed the decade-long monstrosities of the Cultural Revolution. These tragic periods saw the decline and disappearance of intellectuals and scholars. However, today, a new awareness of the importance of learning and scholarship has returned with the imprisonment of the champions and promoters of the Cultural Revolution. It has been realised that the present leadership's determination to modernise the country and its economy, would not succeed without the help and cooperation of intellectuals and scholars.

A relatively free atmosphere for them to read and write, and massive facilities for information dissemination among the new generation are pre-conditions. The government seems to be aware of the importance of this aspect of the development of information science without which the call for modernisation would remain a mere slogan.

Today, China is a member of most of the international organisations. It is eager to absorb what is good for its over-all development from other countries while it keeps emphasising the importance of self-reliance. Thousands of students are sent abroad to study science, technology and social sciences.

China is also a member of the Federation of International Documentation Congress which held its 41st annual conference in Hong Kong during September 6-12, 1982. Of the 250 delegates from 55 countries who took part at the conference, eight were from China. Soon after the conference, the Hong Kong Polytechnic, where the conference was held, organised a two-week tour of China's major universities and documentation centres for the delegates.

As a member of the group which visited Beijing, Nanjing, Shanghai and Hangzhou, I was able to gather some first-hand data on the developments of China's information processing and dissemination.

China has made an impressive start in organizing its information activities. If the present pace is continued, by the turn of the country, Chinese institutions will be able to match those of relatively advanced countries. But the task before China is tremendous, for it faces innumerable hurdles. Funding seems to be the most serious among them. Acute shortage of trained staff is next. Computerisation and automation are difficult, as standardization of classification system and cataloguing poses several problems.

Library education is inadequate; the libraries are manned by high-school graduates with hardly any specialist education in library science. Even the best of libraries, not to mention those in small towns and small universities, do not have adequate amenities -- such as fans, heating, clean toilets, good lighting. Some libraries are not on ground floor, and lifts are not provided either.

In most cases, students/readers have no access to books except through the staff. Unfortunately, the staff, being inadequately trained, can't guide much the readers. Since the books are in closed areas, readers can't look for themselves. Though the libraries are huge, paperbacks form a major proportion of the collections.

The enthusiasm of young people to read and gain knowledge is evident by the large number of readers one witnesses in libraries. If adequate facilities are provided, with increasing collection of reading material, China will see an information explosion in a decade's time, and a generation of scholars and intellectuals, the nation's most valuable asset, if it is put to use intelligently.

2. SCIENCE & TECHNOLOGY DEVELOPMENT IN PRC

After the founding of the People's Republic of China the State allotted massive grants to develop science and technology. Long-term development plans were made and many scientific research institutes established, including the Chinese Academy of Sciences, the Chinese Academy of Medical Science, the Chinese Academy of Agricultural and Forestry Sciences, and other natural and social science research institutes. Research institutes are run by provinces, autonomous regions and municipalities.

In 1955, the Government decided to embark on atomic energy research and the following year a 12 year-plan for scientific development was initiated. The main goals were realized five years ahead of schedule, with many major successes. China exploded its first atom bomb on October 16, 1964 and launched its first satellite in 1970. The National Science Conference was convened in 1978 to accelerate the development of science and technology in China. The eight year-plan (1978-85) drawn up at the conference gives prominence to agriculture, energy resources, computer technology, laser technology, aerospace, high-energy physics and genetic engineering. The scientists and technologists are working hard to fulfil this plan as its realization will speed up the country's modernization.

The research activities are taken care of by the following five categories of agencies:

1. The Chinese Academy of Sciences.
2. Research departments of universities and other institutes of higher learning.
3. Research bodies of various industrial departments.
4. Local institutes of scientific research & mass scientific experimental organizations.
5. The National defence research departments.

The State Scientific and Technological Commission was founded in 1955 to plan, organize and co-ordinate all research efforts. Under it the Chinese Scientific and Technical Information Institute was set up.

The Chinese Academy of Sciences, founded in 1949, reorganized research institutes and set up new institutes to do research on nuclear science, experimental biology, geology, geophysics, etc. About 36,000 scientists and technologists are working in 100 institutes, engaged in research activities for China's current modernization plan. The late Mr. Guo Moruo, an outstanding figure in science and technology, was President of the Academy for more than two decades until his death in 1978. This post is held today by the noted chemist Mr Lu Jiaxi. The Academy publishes more than 77 academic journals on natural sciences.

More than 8,000 research bodies with over 300,000 staff are affiliated to various industrial departments like agriculture, iron & steel industry, railway engineering, post and telecommunications & textile industry etc.

3. ACADEMIC SOCIETIES

Apart from the scientific research agencies there are some 90 societies and associations for specific branches of science and technology. Together they have more than 1,300 branches in the large and medium-sized cities. They form a mammoth network for academic exchange. The China Science and Technology Association, founded in 1958, is a blanket organization of the various specialized scientific and technological societies and associations.

The Association has the following main functions: to sponsor and organize scientific and technological exchange, convene forums, publish academic journals and papers, and summarize and exchange results and experiences; to disseminate scientific and technological knowledge, sponsor and organize scientific experiments among the people in general; to encourage scientists and technologists to make proposals on the country's scientific and technological work; to forge friendly links with scientific and technological bodies and individual scientists and technologists abroad, and promote international exchanges in science and technology.

4. DISSEMINATION

In addition to training scientists and technologists in regular institutes, much attention is paid to the dissemination of scientific and technological knowledge among the public and promotion of popular scientific-technological activities. The subject matter ranges from such basics as mathematics, physics, chemistry, biology and geography to astronomy, meteorology, geology, medicine and health, and environmental protection. The public are also being acquainted with advanced technologies such as electronic computers, principles and applications of lasers, comprehensive utilization of natural resources and energy resources.

Popularization of science and technology in China takes many forms, but essentially it is carried out in the following ways:

1. **Forums** : The China Science and Technology Association and its affiliated societies and planetoriums, museums of natural sciences and other such bodies frequently arrange lectures and exhibitions on various fields of science and technology. Radio and TV stations broadcast science and technological programmes.
2. **Films** : Production and showing of scientific and educational films. China has two special studios, one in Beijing and the other in Shanghai, producing such films. Some provinces, municipalities, autonomous regions and central industrial departments also produce scientific and educational films. The Ministry of Agriculture has its own studio producing films on agricultural topics. Every year, these units produce about 400 scientific and educational films for countrywide distribution.
3. **Science and technological publications:** Many government departments and popular organizations, such as the Popular Science Publishing House under the China Science and Technology Association and national and local publishers, bring out books and journals for the public on science and technological subjects. Large-circulation science journals are Science Pictorial, Scientific Experiment and Knowledge is Strength.

4. **Activities for youth:** Scientific and technological activities for young people are varied and take many forms, such as, radio, aeroplane modelling, meteorology, biology and astronomy groups.There are extra-curricular science and technology classes centred on the basic sciences, applied sciences and new technologies. Also held are meetings between scientists and young people, lectures and competitions in mathematics, physics and chemistry. In 1978, the China Science and Technology Association, together with the Ministry of Education, organized a methematics contest for young people in eight provinces and municipalities. It resulted in the selection of 57 secondary school students who were admitted to key universities without further examinations. In 1979 a national exhibition of scientific and technological works by young people was held in Beijing, which attracted enormous interest.

5. THE INSTITUTE OF SCIENTIFIC & TECHNICAL INFORMATION, BEIJIN

The ISTIC was set up in Beijing in 1956. That laid the foundation for organizing information resources and activities in Science and Technology in China. Initially, started with a meagre staff of 200, it has now more than 1,000 people working full-time, among them 300 are professionally qualified. It has its own printing press, and photocopying facilities.

The ISTIC has the following three major functions:

A. Keeping pace with new developments and updating.

   1. Research on Information Science and Technology.
   2. Publication of research papers.
   3. Printing conference proceedings.
   4. Using audio-visual material.
   5. Updating of subject indexes.
   6. Acquisition of increasing number of secondary periodicals.

B. Dissemination of Information

   1. Publication of technical journals especially on information technology.
   2. Technical processing of documents (according to Chinese system) and translation of overseas journals and research papers.
   3. Providing information to technicians in various industrial departments.

C. Documentation

   1. Getting ready for open access system to the stock.
   2. Reprinting of documents.
   3. Getting feedback from readers.
   4. Organizing Reference Department.
   5. Organizing debates and seminars.
   6. Organzing exhibitions and forums etc.
   7. In order to satisfy the demands of 'Modernization Program', the Institute will soon do research on mechanized indexing and translation.

Future Plans

1. Automation in indexing.
2. Affiliation and cooperation with international organizations to keep pace with the latest developments and to implement their present projects.

6. THE INSTITUTE OF SCIENTIFIC AND TECHNICAL INFORMATION, SHANGHAI

The Institute of Scientific and Technical Information of Shanghai was founded in 1958 as a regional documentation centre under the supervision of the Scientific and Technological Commission of Shanghai.

The principal task of the Institute is to meet the needs for the development of science and technology. It is engaged in collecting, acquiring, classifying, reporting and providing Chinese and foreign documents, carrying out information analyses and organizing exchanges of information, accepting requests for SDI searches — all in the service of universities, research, factories, etc.

At present, the Institute has a staff of over 540. A director and deputy directors direct the operation of the Institute through an administration office and a co-ordination office. The Institute is divided into seven departments, namely:

1. Documentation Department;
2. Shanghai Scientific and Technological Literature Publishing House;
3. Shanghai Scientific and Technical Information Consultancy Service Centre;
4. Scientific and Technical Information Analysis Department;
5. Information Automation Research Department;
6. Documentary Film Department;
7. Printing Shop.

Documentation Department holds about 4,000 titles of periodicals from more than 30 countries and regions of the world and patent specifications from the United States of America, Japan, the Federal Republic of Germany, the United Kingdom, France, the Soviet Union, Canada, Switzerland and other countries, totalling more than 11,000,000 copies. Besides some 650,000 technical reports (such as AD reports, PB reports, DOE reports and NASA reports), the Department also has in collection proceedings of international conferences, standards of various countries, specifications and catalogues of foreign products and scientific and technical periodicals published in China. In addition, the Department also collects more than 300 titles of secondary periodicals, among which "Chemical Abstracts", "Engineering Index", "Government Reports Announcements & Index" and "Current Bibliography on Science and Technology" are complete from their very first issue onward.

Documentation Department bears the responsibility to acquire, catalogue, classify and maintain documents, to provide them to readers, to familiarize readers to the collection and various search methods; to recommend secondary sources; to answer questions raised by users in their searches; and to study the essence, characteristics and search methods of different kinds of documents.

The collection of Chinese documents are classified according to "Chinese National Classification for Books and Other Materials". For all foreign materials, their original classification numbers are generally kept.

Service hours for eight reading rooms are 8:00 AM to 5:00 PM from Monday to Saturday. In 1981, the Department received over 230,000 readers, handled 2,100 enquires for documents; and utilized the services of a number of retired scientists, technicians etc. who have a good mastery of foreign languages to translate scientific and technical materials for research centres and factories. They have now accumulated more than 10,000 translations from English, Japanese, German, French, Russian, Spanish, Italian, Romanian, Czech, Polish and Danish, and all are available to readers.

The reporting of collected documents is mainly done by Shanghai Scientific and Technological Literature Publishing House. It publishes periodicals like "Scientific and Technical News Abroad", cover-to-cover translation of the American publication "Science News", abstracts, indexes and translations of studies done on subjects belonging to various disciplines. In 1981, it published 190 kinds of information materials, totalling 30,000,000 words.

The newly established Shanghai Scientific and Technical Information Consultancy Service Centre renders scientific and technical information consultancy service; fosters technical information exchanges and hastens the flow of information from research units to production units; handles written or verbal enquires, bring different units together to engage in technical cooperation; and offer SDI service upon request.

Photocopying service is provided by Printing Shop. It made over 1,200,000 pages of photocopies in 1981.

In cooperation with outside research workers, Scientific and Technical Information Analysis Department investigates and studies the state-of-the-art and trends of scientific and technological developments at home and abroad.

In the modernization of information process, staff members of Automation Research Department and scientists from other organizations have been concentrating on the development and application of computerized typesetting of Chinese characters and computerized retrieval of information for the last few years and have achieved some progress. In the meantime, they have made preparations to share in the studying of computerized translation of documents.

The task of Documentary Film Department is to make films and videotapes of scientific and technical subjects and project the resulting films and tapes to the public.

Main features of ISTIC at Shanghai

1. The headquarters of ISTIC is at Beijing; the only branch is in Shanghai; regional documentation centres are in various provinces.
2. Though Shanghai ISTIC is the branch, it works independently and follows post coordination policy. Every effort is made to be self-reliant though occasional exchange and coordination programes are organized.
3. Computerized Retrieval System and Computerized Typing System are at present under experiment.
4. After 1978, a large number of documents were received from FID.
5. ISTIC has a huge storage room for microfiche and a separate room for microprint reader.
6. 40 fen (Chinese cents) are charged for title search, and 50 fen for Abstracts Search.
7. The annual budget is:

   2.49 million yuan in 1981

   2.54 million yuan in 1982

   over 1.4 million is spent for purchasing of reading material out of which over 90% is spent for foreign publications.

7. BEIJING UNIVERSITY

The Beijing University campus occupies about 145 hectares of land on the northwest outskirts of Beijing in a beautiful park-like area which dates back to the Qing Dynasty. Originally, the campus was founded to house the famous American Methodist Yanjing University. In the later part of the 19th century, many schools were set up for western learning among which the Capital College (Jingshi Daxuetang) was the only institution that survived the 1911 Revolution. The College was renamed as Beijing University.

Though in earlier days academic freedom was not encouraged, after the appointment of the well-known educationist Cai Yuampei as the chancellor in 1917, many reforms were introduced. People of different schools of thoughts expressed their views openly and held debates in a free atmosphere and the university grew very soon into an ideological and cultural centre of China.

In 1918, Mr Li Dazhao, who organized the first Marxist Study Group in China and later became the founder of the Chinese Communist Party, was appointed as the Chief Librarian and the Professor of Economics. Chairman Mao Zedong worked in the library during 1918-1919. He devoted himself to the study of Marxism. The rooms where Mao Zedong and Li Dazhao worked are still kept intact in the Red Building.

In 1952, Beijing University was amalgamated with Yanjing University and the Yanjing campus became part of the capital institution. A modified Chinese style of architecture was adopted for its main buildings. Winding paths and stream still flowing past the older buildings with their huabiao (stone animals) standing in front are the reminders of historical change and progress. It has beuatiful surroundings. In the northwest side of the campus is Weiminghu Lake, reflecting the pavillions and the pagoda-style water tower along its shore.

The University has 22 departments teaching 66 subjects and has 14 research institutes, with 8,000 students. The admission is highly competitive and only the most outstanding students are selected. According to recent statistics, only top five students were admitted for studying Mathematics, and only two top students for Arts & Sciences among 4.6 million students who took the National Entrance Examinations in 1979. Student's tuition is paid by the Government as at other institutions of higher education in China. The well-equipped University hospital provides free medical care, and government grants are available to students from poorer families.

The faculty of the Beijing University is considered among the best in the country, and many of its 380 professors are well-known scholars. The famous demographer, Ma Yinchu, who advocated planned population growth in 1957, was President of the university in the 1950s. On the south side of the campus behind a bamboo grove is the residence of the famous linguist, Professor Wang Li. Wang Li has spent more than 50 years studying the Chinese language and has written many books and papers on Chinese phonetics, grammar, linguistic history and prosody.

The University provides a favourable environment for scientific research. University researchers have developed the principal part for a system of laser editing and typesetting of Chinese characters, which has modernized China's printing and photo-composition.

Graduates from the University and the former Yanjing University are now scattered throughout China and the world. Many of them have become outstanding scholars and statesmen. Noted geologist Li Siguang was appointed head of the geological department in 1929. It was he who first pointed out that the continental deposit was oil bearing, repudiating the theory that China was an oil-poor country. His student, Pei Wenzhong, was a member of the team which discovered the 500,000-year-old skull of Peking Man.

Many foreigners have taught, studied or worked at the university, and some have become close friends of the Chinese people. The most famous among them was American journalist Edgar Snow, author of Red Star over China, a book that caused a stir throughout the world. In 1934, Snow, then a correspondent for Asia for the Saturday Evening Post, was also a part-time lecturer in the department of journalism of Yanjing University. While studying Chinese and writing his dispatches, he was close to students with progressive ideas.

China's present Foreign Minister Husang Hua was then a leader of the Yanjing Students Union, and later went to Yenan with Snow's help. When the War of Resistance against Japan broke out in 1937, Deng Yingchao, wife of the later Premier Zhou Enlai, was recuperating from an illness in the Western Hills. Snow disguised her as his nurse to help her leave Beijing safely and avoid arrest by the enemy. Before his death, Snow asked that a part of his ashes be buried in China. A site on the banks of the Weiminghu was chosen, and a white tombstone now marks the spot where the ashes were buried. Zhou Enlai and Deng Yingchao were present at the internment in 1973. With deep feeling, the Premier said, "He will remain here. The Chinese people will never forget him."

In the thirty years since Liberation, more than 2,500 foreign students from over 50 countries have studied at the University. The present enrolment of foreign students is around 130. Most of them spend at least one year studying Chinese at the Beijing Languages Institute before proceeding to university classes in Chinese literature, history, philosophy, economics, chemistry and biology.

71 *Beijing University Library*

The Beijing University Libary was established in 1898. It is considered as the largest University Library in China. It has 23 departments, 12 for natural sciences such as Chemistry, Physics, Mathematics etc and 11 for liberal arts like History, Philosophy, Law, Library Science, Western and Eastern languages etc.

Among 9,000 students in the University, 800 are postgraduates and 200 students are enrolled on Exchange Programme from 20 countries. The University's teaching staff number 2,000. There are a number of research institutes attached to the University e.g. Institute of Asian and African Studies, Institute of Natural Sciences. It has its own Publishing

House producing two journals one on natural sciences and the other on social sceinces.

There are 31 reading rooms in the library which have seating accommodation for 2,000 readers. It has a total of 3,500,000 volumes of monographs of which 900,000 are non-Chinese. Among 20,000 periodical titles in the library 9,000 are non-Chinese. Audio tapes are used to provide instructions on how to use the library, and special seminars are held on how to use reference books like dictionaries, encyclopaedias etc.

The catalogues are divided into.

1. Chinese language (only two entries, Main and Classified)
2. Non-Chinese language (Main and added entries).

The collection is kept in closed area; access is possible only through library staff; part of the old collection was classified by a Chinese adoption of Dewey Decimal Classification while the rest by a Chinese Classification Scheme. Ten floors are occupied by the library; annual increase of stock is approximately 100,000 volumes. There is a large number of old manuscripts from 6th to 7th centuries, and also from the Ching and Ming Dynasties.

8 NANJING UNIVERSITY LIBRARY

It ranks second after Beijing Library, because of its long history. It has a total area of 17,000 sq. meters. Collection totals 2.7 million volumes of which 1.3 million is in Chinese and 55, 000 in foreign languages. It has a total of 8,500 periodicals. At the entrance, a huge Display Guide Map of different departments the sections catches the attention of visitors. Except for the faculty staff and research students, the entire collection is in closed access. They organize orientation programs for the effective use of the library. They have training facilities for professional staff of the library. The capacity of the reading rooms is for 10,000 students. They have a special audio-visual room. 600 periodicals are displayed; after the display, they are circulated to different departments. In due course, they are bound and stored in the Main Library. Though the library has exchange facilities, it prefers to purchase original copy of documents in line with the self-reliance policy.

91 Beijing Library

Beijing Library, China's national library for more than 70 years, is the country's largest, both in size and in number of books. It now contains more than 9.8 million volumes, documents and manuscripts, seven times as many as in 1949, and 100 times as many as it had at its founding. The main library building, a palace-style structure with green glazed-tile roof, stands inside a red-walled compound to the west of Beihai Park in the centre of Beijing. Its predecessor was the Qing Imperial Library, founded in 1910 and opened to the public in 1912 after the Republican Revolution. Although, as a national library, it is comparatively young, much of its collection can be traced back to earlier times. For instance, it has inherited the collections of the Jixidian, the Imperial Library of the Southern Song dynasty, and of the Wenyuange, and the Imperial Library of the Ming dynasty.

On its founding in 1910, it incorporated the Cabinet Library, the Imperial Academy Library and the Imperial College Library from the Qing court, plus some private libraries; it subsequently acquired the Siku Quanshu, formerly held at the Wenjinge in Chengde, manuscripts from the Dunhuang Grottoes and the library of the Yang family from Liaocheng, Shandong. Since 1949, the library of the Yang family from Liaocheng, Shandong. Since 1949, the library has been further enriched through purchases,exchanges and gifts.The Siku Quanshu (Complete Library of the Four Treasuries of Knowledge), an encyclopedic collection of pre-modern books compiled 200 years ago, is stored in the rare-book room. Its 3,503 titles in 36,304 volumes are divided into four categories: classics, history, philosophy and belles lettres. It is one of the seven original manuscript copies, and is bound in traditional Chinese thread-bound style with covers of green, red, blue and grey silk.

The rare-book room also houses the famous Yongle Dadian (Yongle Encyclopedia), completed 570 years ago under the Yongle Emperor of the Ming dynasty. It originally consisted of 11,095 volumes in 22,937 fascicules, but most of them were lost in the plunder and destruction by the Western powers in 1900; only some volumes are left in the Beijing Library.

There are also quite a number of books printed from wood blocks dating from the Song, Jin and Yuan dynasties (10th to 14th centuries). Among them is what may be the world's earliest bound book, Wenyuan Yinghua (Flowers from the Literary Garden), from the Jixidian Collection in the Southern Song Imperial Library. The book was designed and bound by a Chinese worker named Wan Run in 1260. Others include incomplete Song dynasty edition of Kaibao Zang made from a block cut in 971; Zhaocheng Zang, printed from stone blocks in 1148 under the Jin dynasty; Mengxi Bitan (Notes from the Dream Brook) printed in 1305. Shizhuzhai Jianpu (Designs for Letter Paper from the Studio of Ten Bamboos), printed from blocks engraved around 1644, features colour illustrations and is considered a master-piece of Ming dynasty colour printing.

The library has a great number of other thread-bound books on many subjects including philosophy, economics, politics, military affairs, literature, art, history, geography, astronomy, mathematics, chemistry, medicine, architecture and hydraulics. It also has books in the languages of more than twenty minor languages of China, including Mongolian, Manchu, Uygur and Korean.

The periodical collection has complete sets of Chinese and foreign publications, including the Proceedings of the Royal Society of Edinburgh (1788), Nature (1869) and the U S Chemical Abstracts (1907). There are also fairly complete sets of some early Chinese newspapers and magazines including Dongfang Zazhi (Eastern Miscellany) from 1904, Minbao (People's Herald), Shizu (Current Affairs) and Shenbao (Shanghai Daily).

Since 1949, the library has acquired many volumes of Marxist classics and documents of revolutionary significance. They include original letters between Marx and Engels; a copy of the first German edition of Das Kapital published in 1867; one of the first Russian editions of Lenin's What is to Be Done?; an early edition of the late Chairman Mao Zedong's On New Democracy printed from wood blocks; Shao Nian (South), a magazine edited by the late Premier Zhou Enlai while a member of a Chinese communist student group in Paris, and many publications from China's revolutionary base areas during the war years. Along with these in the rare-book room are original manuscripts by famous modern scholars and writers, including Lu Xun, Gua Moruo, Mao Dun and Ba Jin.

Today, Beijing Library has taken on a new look. The fifteen reading rooms with 2,000 seats are full everyday with readers ranging from professors and specialists to young technicians, workers and students. In 1978, 590,000 readers were admitted. Though its floor space has increased from the pre-Liberation 8,000 square metres to 50,000, it still cannot accommodate all those who wish to use it. A new library building is under construction, and new reading rooms are being set up.

Beijing Library has done much to promote cultural exchanges with other countries. It has exchange relations with 2,000 libraries in 120 countries and Hongkong and Macao; librarians from Beijing Library have been on delegations visiting libraries in the United States, Japan, Australia and Britain.

92 Zheijiang University Library, Hangzhou

Zhejiang University is known as the Chinese MIT (Massachusetts Institute of Technology). Very recently it celebrated its 85th anniversary. It is the second largest, after the Beijing University.

The new library building was completed in 1982. The entire collection is of science and technology. It has 2 million books in stock and 13,000 periodicals of which 5,100 are subscribed from foreign countries. In foreign languages collection, English, Japanese, Russian, German and French are the main languages. The library has 93 professional staff. They purchase over 80,000 books yearly. The chief Librarian is Mr Yan Wenxing, who is also Professor of Chemistry, Director of Library of

Zhejiang University, Hangzhou and member of Council and China Society of Library Science.

Four thousand secondary periodicals are in the stock. Half a million yuan is the annual budget which does not include staff salary.

There is a shortage of qualified professional staff in the library. Mostly high school graduates work in the library. It doesn't have its own training facilities to train them. Five storeys have been occupied by the stock. Enough room is kept for future expansion. The present library has moved from place to place many times. That's why the staff spend a lot of time in planning and organizing the whole set up. Some years ago the books on Medicine and Agriculture were moved to their respective universities, as they were separated from the present Institute.

The library operation as well as technical processing of reading material are not computerized as they have ahead a great task of standardizing classification and cataloguing practices according to the Chinese system. At present, they adopt a modified Dewey Decimal scheme and, sometimes, a scheme somewhat similar to the Library of Congress Classification Scheme but with single alphabet. The whole collection is in closed access except for the teaching staff and the research students. The Chinese Guang Hua Publicity Agency (Beijing) reprints expensive reference books published in foreign countries. Though they are aware of the Copyright Convention, they cannot afford to buy many copies of foreign reference books as well as primary and secondary periodicals.

93 General Observations

1. The people are very eager and enthusiastic to modernize their country.
2. Every effort is made to speed up the plans and programs.
3. During the period of the Cultural Revolution, the intellectual community suffered severely; now there is a widespread realisation that China is lagging behind the Western countires in many spheres.
4. Though Chairman Mao worked as the Librarian at the Beijing University Library, his name was not uttered. Generally people try to avoid speaking about him, giving the impression they are trying to deemphasise his image and work.
5. Self-reliance is the main consideration at every policy decision, though the leadership is keen to achieve progress quickly.
6. The stock of the Russian books is very outdated. After 1960, no new titles of the Russian reading material were added.
7. China has close cooperation with Japan and U.S.A. as far as its computer technology is concerned.
8. With the present speed, China will certainly achieve its objective of modernising the country by the end of this century.
9. People are very polite, kind, cooperative and of cardial nature. National interest and pride seem the decisive factor in people's speech and action.

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ORGANIZATION OF PATENTED INFORMATION

NANDA DULAL BASAK
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Indian Statistical Institute Library
202 Barrackpore Trunk Road
Calcutta 700 035

The importance of patents as source of S&T information has been emphasized. Policies regarding their procurement and organisation are discussed. Aspects of information service from the patent literature are dealt with.

1 DEFINITION OF PATENT

A patent is briefly defined as a "Government grant of exclusive privilege of making or selling the new inventions". In this context, "invention" refers to something which concerns "Manufacture". Essential requirements of a patentable invention usually are (i) manner of manufacture, (ii) novelty, (iii) inventive ingenuity, (iv) utility and (v) law and morality. Thus products, methodologies and inventions only can be patented. Theories and ideas are always excluded. The inventor(s) is/are guaranteed with the sole right for certain period of years (14 years in India) to use or sale the invention(s). "Patent system now operate in most countries of the world. Each year more than a million patent documents are published by some 70 countries, with Japan leading the field".(3) (see Table 1)

2 WHAT IS CONTAINED IN A PATENT

A patent document contains the following information.

(1) *Patent Number* - Serial number assigned to a patent with the name of the country at the time of issue. Under ICIREPAT systems a two-letter country code has been developed.

(2) *Date of issue* - The date from which the security is assured to the inventor(s) and the period of protection is calculated i.e. the Priority Date.

(3) *Date of Application & Serial No.*

(4) *Title*

(5) *Name of the Patentee*

(6) *Classification No.* - According to the Patent Office Classification and/or International Patent Classification.

(7) *Specifications* - Body of the patent including detailed technical information both in literary and graphical form.

2.1 *Kinds of Patents*

In addition to the conventional ones, there are three more special kinds of patents -

(1) *Patents of addition* - Patented invention, further improved and modified either by the original inventor or some one else is protected by it.

(2) *Secret Patents* - Invention(s) relating to instruments and ammunitions of war is/are granted secret patent.

(3) *Priority Patents* - These are granted under a reciprocal priority arrangements established between the home country and a few Commonwealth countries.

3 IMPORTANCE OF PATENT

About one third of the S&T information generated is contained in the patent documents alone. About 500,000 patents of new solutions, trends, and new techniques filed each year throughout the world is a mine of S&T information. It is also a practical truth that certain inventions could only be known through patents and no other form of scientific publication media. Studies in UK, USA show only 10% of patented technology are reported in non-patent technology literature. "S&T information is primarily to be found in patent documents besides books, reports and periodicals..."(3)

The stock of information on new technological processes may be enriched by a good collection of patent documents relevant to the interest of that particular library and its users. The development of

Table 1: Patent publications issued upto 1980 (according to WIPO estimate)

Country	Japan	F R G	France	U S A	USSR	U K	Netherlands
Numbers	300,000	134,000	70,000	70,000	45,000	45,000	26,000
% of Total	11.1	4.96	2.59	2.59	1.66	1.66	0.96

Italy	Australia	Spain	Canada	Switzerland	India	Others	Total
25,000	25,000	22,000	20,000	4,000	3,000	215,000	27 million
0.92	0.92	0.81	0.74	0.14	0.11	0.79	100

such a patent based library/information service is essential for the furtherance of R&D projects.Patents, being one of the primary published sources of information, limited to new inventions, do have importance to the inventors as these aid in avoiding duplication by unfolding the so far advancements. This serves the interests of the nation and its economy. The information disclosed in a patent, but not covered by the claims sections, may freely be used without permission. These ideas once known may stimulate developments in other fields.

There may be two circles of users of patents - i) inner circle: who need them for legal/technical purposes and ii) outer circle: who need them as source of information on technological development.

The industrialists, the manufacturers and the entrepreneurs will find in patent a major source of information which can accelerate the growth of patents for newer inventions, development of industrial products and inter- or intra-state technology transfer. So, the patent literature demands distinctive treatment in a technical library as it is a significant part of the library's resources.

4 PROCUREMENT & ORGANISATION OF PATENT

Patent Offices are at the apex of the patent system. To know about the availability of new patents, one can depend profitably on various publications of patent offices, such as, Patent Office Handbook, Guide to inventors, notifications regarding new patents in the National Gazette, Patent Office Journal and Annual reports. For acquisition, it is necessary to scan these sources of information regularly.

Other sources of information on new patents, include reviews published in scientific and technical journals of the relevant fields, indexing and abstracting journals, commercial periodicals devoted solely or partially to patents, patent digests, patent journals and lists published occassionally (for example see Table 2). Regular scanning of the lists of additions published by large libraries, keeping in touch with the periodical publications of different research organisations and industrial houses, and looking through the stock of Patent Office and Patent Inspection Centres (58 such centres now exist in India) are to be regularly done. Many Patent Offices issue abridgements of patents granted. These may be searched. After collecting information regarding the publication of new patents, relevant to library's need, approach should preferably be made direct to the patent offices of the respective countries. The patents being mostly government documents, acquisition of these are not possible through other procurement methods. So, approach is to be made direct to the office concerned without any intermediate vending agent unless otherwise specially engaged by the respective patent office. For any retrospect patent, rather than the recent ones, distributors/agents specialised in dealing with government publications should be contacted first and then only a rare book supplier may be engaged.

When the interest of an organisation is well defined, it is advisable to place standing orders with the Patent Offices. If the required patent is not available with the Patent Office concerned, then it may be possible to acquire a hard copy from the same office or any library. A special library need not col-

Table 2: Patent Information/Abstracting Services

(A) Exclusive Patent Abstracts

- (i) Official Abstracts:
  - Abridgements (British Patent Office)
  - Official Gazette of the US Patent and Trademark Office– Patents(USA);
  - Abridgements of Indian Patents (India)
  - Resumes In Bull de la Propriete Industrielle (French Patent Off)
  - ... etc.
- (ii) Commercial/Non-official Abstracts:
  - Auszuege aus Auslegesohriften (Wila Verlag fuer Wirtschaftswerbung Wilhelm Lampl, Munich, FRG)
  - Basic Abstracts Jr (Derwent Publications Ltd., London)
  - Airplane Patent Digest (Manufacturers Aircraft Assn Inc. NY)
  - ... etc.

(B) Abstracts which include Patents

- Chemical Abstracts
- Science Abstracts (INSPEC, IEE, England)
- Referativnyi Zhurnal
- Computer Abstracts (Technical Information Co., St. Helen, Jersy)
- Desalination Abstracts (Cent of Sc & Tech. Inf., Tel Aviv)
- ... etc.

lect all the patents. Instead, they should attempt a sectoral comprehensiveness in the collection of patents having relevance to the research work done by the parent organisation. Special libraries need them for continuous and expeditious use by the researchers, scientists and technologists. These patents being usually made up-to-date, by 'amendments' and 'reissues', the special librarian should therefore keep a constant watch on such publications and take necessary steps to ensure their procurement automatically and quickly.

41 *Organisation of Patent literature*

While deciding on the different steps in organising patent documents in a library, it should be kept in mind that these will generally be sought by the users for patentability search, state of art search, infringement search, validity search and index search. Different steps are to be co-ordinated in such way so as to compliment each other in their objective of satisfying users' need.

5 STORING/FILING OF PATENTS

This form of document, being one of the essential reference tools to the professional experts associated with research, development and production line needs special attention. While deciding the methods of storing/filing in the library's stock together with other form of documents, the important factors to be kept in view are: a) library-users' need, b) the overall nature of the library, c) other form of document collection and d) the available techno-economic facilities. However, mention may be made of the various available methods of storing/filing patents in a library. A particular library should think from its own perspectives before adopting any of these. Some of the available methods are:

1) Keeping the patents mixed with other form of documents like books etc. in the general stock, is the most conventional way, practiced in most libraries having a small collection of patents. Those following DC for their document classification, may assign either the number relevant to the subject content or the class number of patent in the technology class to a particular patent. The latter method will ultimately result in bringing all the patents in one position on the shelves. UDC's form division, if used, will indicate the form difference of patents. A further step may be attempted by distributing the patents of similar or allied subjects in the stack in packets, within *BOX FILES* assigning common class number/subject headings.

2) Patents of all countries bear their own Patent Office Classification code numbers. They are universally referred to and usually known by their code numbers. Hence, they should most conveniently be filed/kept in numerical sequence under country in vertical files/box files/or transfer cases. On the wide cover of each box a complete list of specifications or the first and last numbers or code numbers of the patents may be pasted on. Patent documents are sometimes kept in two sequences a) domestic and b) foreign. Foreign patents may be filed in separate places and arranged alphabetically within the class by country of origin. This procedure may successfully be practiced in libraries having both sizable and small collection of patents in their stock. A parallel stock for patents is thus established.

3) The libraries (e.g. Patent Office, Patent Inspection Centre) where patents form the major part of their document collections, the present trend is to keep them in bunches of 100 successive numbers, grouped in batches and stored in racks or pamphlet boxes.

6 SHELVING

Unlike books, patents have poor physical rigidity. Hence, they need to be kept in specially designed folders. Each vertical file/folder or box file must bear the starting and the last serial/code numbers of the patents stored therein.

7 INDEXING

Index to all patents in the library stock, referring to their contents and location is necessary. Apart from Patent Offices, or organisations similar to them, in all libraries associated with R&D centres of industrial establishments and institutions conducting researches on "vendible product", it is always advisable to keep the patent documents in a parallel sequence completely segregated from general stock of other conventional types of documents. As a complementary to the shelving system, an indexing system for retrieving the information regarding the patents for satisfying various queries should be maintained. Subject headings may be had from P.O. Classification schemes, general library classification or the titles and contents of patents. Reference may be made to Indian Institute of Petroleum which has been engaged in drawing up unique indexing scheme exclusively for patents. Approaches like, name of patentee, title, patent no. etc. should be satisfied by the index.

8 NOTES

In case all the patents are kept in a broken sequence, the users must be guided from a prominent place (i.e. catalogue, circulation counter, etc.) to their physical location in the library. Information about the available patents may be disseminated to the users through abstracts issued by the patent offices, and abstracting journals (see Table 2).

The difficulties in retrieving technical information in patents arise from the patents' legal jargon, juristic phraseology, language barrier etc. A patent document at times includes only the minimum specific information of the patented technology. It may not provide the general information without which one cannot make ready use of the patented technology.

Indian patents are assigned serial numbers as soon as they are filed, and the final patents carry the same serial numbers. Since a number of them are not finally accepted, and declared void, there are usually many gaps in the serial numbers of the patents sealed. This creates a problem to the acquisition librarian, since an expeditious scrutiny has to be made before ordering a patent. In USA and some other countries, this problem does not arise.

91 Suggestions

1. The patents, at least those which are connected with the rural technology should be translated in the local languages. The respective State Governments are expected to take initiative in this matter. The State Library System through its "Package of information" should have provisions to make the relevant patents available to the rural areas.

2. For patent information, a national information system having stock of both domestic and foreign patents is to be created and it should take full responsibility for the effective exploitation of this

vast source of technological information with the help of other similar organisations. The national Patent Office Library should preferably be entrusted with this responsibility which will include the provision of reprographic, translation, indexing and abstracting services of the patents in co-ordination with the other institutions at the national level.

3. The schools of library and information science should train their students in the better handling of this form of documents so that they may provide best form of information when needed.

4. Courses on patent information both at national and international level should be organised. Programmes of these courses should be worked out "so as to ensure theoretical background and practical skills for the office workers and specialists... whose present or future jobs are connected with patent information or many-sided examination of inventions".(4)

92 *Concluding Notes*

We are happy to know that "the Ministry of Industry and Civil Supplies has approved a scheme for setting up a sectoral centre *for* Patent Information which will be integrated with the NISSAT sectoral system".(1). "A detailed plan has been prepared for the establishment of a Patent Library & Information Centre which will not only serve as a depository for Indian and foreign patents but also undertake patent literature search and information service".(2) "It is to be hoped that the proposed Patent Information System at Nagpur which will include Indian and international patent literature will achieve much in this country".(3)

A recent study(5) on the use of patent in industry conducted by New Castle-upon-Tyne Polytechnic revealed the general ignorance of any other function of patent than its protective role. Even the patentees make no use of the information freely available in the rival firm's patents. They design their products independently and finally conduct patent search as a measure against possible infringement. Some researchers are of opinion to include 97% of the printed primary literature (including patent) in the Current Awareness Service only.

REFERENCES CITED

(1) Kamath, V.A. Role of information systems in national development. *In* Science and technology in India *ed* by Vadilal Dagli, S. Chand. 1982. P 276-91.

(2) *ibid.*

(3) Rayninger, Haripriya. Patents as an early source of S&T information. *Hindu.* December 9, 1981.

(4) Moscow course of patent information. *Youth Review.* 18(6), 1982. P5.

(5) Reading into a reluctance towards patents. *New Scientist.* June 4, 1981. P.625.

FURTHER READINGS

1. Dodd, V S. Development in patent documents. *Aslib Proc.* 31(4), 1979. P 180-190.
2. Gupta, S K. Patent literature in special libraries and information centres. *IASLIC BULL.* 25(1), 1980. P 45-48.
3. Novjot Kaur. Role of patent information in the transfer of technology and promotion of domestic technology in India. *In* IASLIC special publication no.20. 1980. P 97-104.
4. Krishnan, A. Patent as a source of information. *Ann Lib Sci Doc.* 27(1-4), 1980. P 78-89.
5. Kumar, D & Garudadwajan, B. Patent information system: a procedure adopted by IIP. *IASLIC BULL.* 25(2), 1980. P 73-86.
6. Pai, R B. Patents for inventions. New Delhi, /CSIR. 1956.

Appendix - I

Patent Associated Organisations & their Services

Abbrvn + Full Name	Activities/ Objectives	Services Offered
NRDC: National Research Development Corporation (New Delhi)	Licensing & Commercial exploitation of patents arising from National Laboratories and Public Sector R&D Centres.	Patent-Know-How, training, help in importing equipment & raw materials.
INSPEC: Information Services for the Physics & Engineering Communities (IEE, Hitchson, Herts, England)	Help patent searching authorities with most sought non-patent literature	Full text copy service, photocopy of article & information sheet with English Abstract for non-English articles.
JAPATIC: Japan Patent Information Centre 1971		
WIPO: World Intellectual Property Organisation. (Geneva) 1967.	Protecting intellectual property throughout World, Development of IPC, World Patent Bibliographic Data Bank, Co-operative Patent Search.	
ICIREPAT: International Co-operation in Information Retrieval among Patent Examining Offices. (Geneva) 1962	Standardize patents, develop computerised patent searching system	
INPADOC: International Patent Documentation Centre. (Vienna). 1972.	Information file entitled IPADOC data base covering 90% world patent. Largest up-to-date collection of 16 mm microfilm copies of patents.	Publications: i) International Patent Gazette ii) Patent Family Service iii) Patent Classification Service iv) Patent Application Service v) Numerical Data Base and vi) Supply of copies of patent in microfiche.

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STATUS OF DOCUMENTATION ACTIVITIES IN INDIAN UNIVERSITIES

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Stresses the need of documentation activities in University libraries in view of the increasing emphasis on research, investigates the documentation activities in 32 responding universities. Concludes that the information services are inadequate and there is under utilisation of the resource potential of academic libraries.

1. INTRODUCTION

After independence, the number of Indian universities and such institutions that are deemed to be universities has risen from 17 to 110. These seats of higher learning are no longer simply examining and degree awarding bodies but also important centres of independent research in pure sciences, social sciences and the humanities. Also, some of the universities and Institutes of Technology have become dedicated centres of applied research in agricultural sciences and mission-oriented projects. Scientific investigations and analysis are pursued as actively as post-graduate teaching. The research output, both fundamental and applied, has merited recognition in India and abroad. The libraries of these institutions must, therefore, prove upto the task of upholding the research activities of their parent institutions and thus there is a visible shift in their scope, functions and activities.

2. NEED

Though 75 per cent of the research in India emanates from the universities, the information services provided by the libraries are anything but adequate. The purpose of information and documentation activities is to assist the researcher in all possible ways in the collection of entire material available on the subject of his study in the form of preprints, reprints, microforms, computer-tapes, film strips, audio-tapes, films, video-tapes and even recorded music from any source including national and international documentation centres/libraries. Documentation activities in fact entail preparation of lists of relevant documents, procurement of documents or their copies and translation services or making necessary arrangement for getting documents in foreign languages translated by a competent agency on demand.

It is essential for the libraries to undertake documentation activities to disseminate the right kind of information to the right person in the right manner keeping in view the geometric rate of growth in the volume of reading material [1], the need of resource sharing [2], specialisations, multidimensional research in the universities and their inter-disciplinary character.

Documentation services/activities in the universities may include

i) Co-ordination and integration of research (within and outside the university) with the national and international information systems.
ii) Symbiosis of research (pure and applied research).
iii) Conservation of research activities (computation and analysis of data generated by researchers throughout the universities).

iv) Training of researchers to enable them to understand the utility of documentation work and activities.

v) Retention of data in microform for ease of use and reproduction.

3. METHODOLOGY

The present study is based on personal experiences, observations and empirical investigations. The questionnaire, our main source of investigation, is based on the matrices of the UGC sponsored report of library committee [3]. Even after 17 years, the report has relevance because the basic pattern of requirements of specialised readers remains almost the same. Moreover, our national documentation centres, Indian National Scientific Documentation Centre (INSDOC) and Indian Council of Social Sciences Research (ICSSR), also adhere to services mentioned in this report. The questionnaire (Appendix-1) was mailed to all the 110 universities and institutions deemed to be universities in order to assess the existing status of documentation services in Indian Universities.

Table 1: Inter-library loan/document procurement service

Sl. No.	University Library	Demand Position	%age of Demand met	Availability of Union Catalogues		Library included In Union Catalogues		Postal Expenses borne by
				INSDOC	ICSSR	INSDOC	ICSSR	
1.	Andhra, Waltair	Very good	50	-	Yes	-	Yes	Library
2.	Banaras Hindu, Banaras	Heavy	10	Yes	Yes	Yes	Yes	-
3.	Bhopal, Bhopal	Heavy	70	Yes	x	Yes	x	Reader
4.	Central Institute of English & Foreign Languages, Hyderabad	Fairly Good	15	x	Yes	x	Yes	Library
5.	G.B.Pant University of Agri. and Technology, Pantnagar	Frequent demand	25	Yes	Yes	Yes	x	Library
6.	Gujarat Agri. Ahmedabad	Low	-	-	-	-	-	-
7.	Gujarat Vidyapith, Ahmedabad	Low	-	Yes	Yes	Yes	Yes	-
8.	Guru Nanak Dev, Amritsar	Low	100	Yes	Yes	Yes	Yes	Library
9.	Himachal Pradesh, Simla	Low	60	Yes	Yes	Yes	Yes	-
10.	I.I.T.,Bombay	High	95	Yes	Yes	Yes	-	-
11.	Indira Kala Sangeet,Khairagarh	Low	50	x	Yes	x	x	-
12	Jabalpur, Jabalpur	Low	-	Yes	x	Yes	x	Library
13	Jawaharlal Nehru, New Delhi	Heavy	80	Yes	Yes	x	Yes	Library
14.	Kurukshetra, Kurukshetra	Low	60	Yes	Yes	Yes	Yes	-
15.	M.D., Rohtak	Medium	10	Yes	Yes	x	x	Readers
16.	M.S. of Baroda	Low	50	-	-	-	-	-
17.	Marthawada, Aurangabad	High	70	Yes	Yes	x	x	Library
18.	Meerut, Meerut	-	-	Yes	Yes	Yes	Yes	Library
19.	North Eastern Hill, Shillong	Medium	-	-	-	-	-	-
20.	Osmania, Hyderabad	Good	90	Yes	Yes	Yes	Yes	Library
21.	Panjab University Extension Library, Ludhiana	Moderate	70	x	Yes	x	Yes	Readers
22.	Panjab, Chandigarh	Low	70	Yes	Yes	Yes	Yes	Readers
23.	Punjabi, Patiala	High	45	Yes	Yes	Yes	Yes	Library/Readers
24.	Sambalpur, Sambalpur	Medium	-	Yes	Yes	Yes	Yes	Readers
25.	Sardar Patel, Vallabh Vidya Nagar	Medium	60	Yes	Yes	Yes	Yes	Library
26.	Shivaji, Kolhapur	Heavy	-	Yes	Yes	Yes	Yes	Library
27.	South Gujarat, Surat	Medium	100	Yes	Yes	Yes	Yes	Readers
28.	S.N.D.T. Women, Bombay	Good	5	Yes	Yes	Yes	Yes	Readers
29.	Sri Venkateswara, Tirupati	High	70	Yes	Yes	Yes	Yes	Library
30.	University of Agricultural Sciences, Bangalore	Medium	40	Yes	Yes	Yes	Yes	-
31	University of Kashmir, Srinagar	Low	95	-	-	-	-	-
32	Vikram, Ujjain	Good	100	Yes	Yes	Yes	Yes	Library/Readers

4. RESULTS OF THE STUDY

Thirty two university librarites (Table 1) responded to the questionnaire. The study reveals that none of the universities provide all the documentation services. Document procurement/inter-library loan, supply of documentation lists/bibliographies, news-paper clipping, indexing and abstracting, reprographic and translation services are provided by 32,10,7,7,21 and 6 of the responding libraries respectively.

4.1 Document Procurement Service/Inter-Library loan

All the responding libraries claim to be providing inter-library loan/document procurement services to varying extent (Table 1). Most of them have reported to be meeting more than 50% of demands. This is quite encouraging even though this service remains restricted to the demands regarding books only.

The primary function of this service of providing nascent thought to the researcher by supplying the latest relevant articles published in established periodicals without significant loss of time, is not being performed. Even the researchers do not approach the libraries for the latest articles as they are not aware/sure whether they can have the article in reprographic form or not.

Almost all the university libraries receive/purchase Union Catalogues of periodicals/serials published by ICSSR and INSDOC for the location of particular periodicals. These catalogues are not of much value as the librarians find it difficult to disseminate the information to the researchers. They have their own problems of inadequate staff, non-availability of funds and the like.

University libraries depend upon P & T department for procurement of documents/

Table 2: Documentation Lists/Bibliographies

Sl. No.	University Library	Supply of Documentation List on Demand	In Anticipation	Form of the Documentation List
1.	Central Institute of English & Foreign Languages, Hyderabad	Yes	Yes	Publish local Docum. list
2.	G.B. Pant University of Agri.& Technology, Pantnagar	Yes	Yes	-do-
3.	Gujarat Vidyapith, Ahmedabad	Yes	Yes	i. Prepare & supply docum. list. on demand ii. Publish Gujarati Samayik Lekh suchi 1975 & 1976 in press.
4.	Jawaharlal Nehru University, New Delhi.	Yes	Yes	Publish local docum lists.
5.	Marathwada University, Aurangabad	Yes	Yes	-do-
6.	Panjab University Extension Library, Ludhiana	Yes	Yes	Classified catalogue of doctoral awards of Panjab University for the years 1948-1964 with supplements upto 1976.
7.	Punjabi University, Patiala	-	Yes	i. Periodicals received this week. ii. Uni.Lib New letter convey addition of books.
8.	S.N.D.T. Woman's University, Bombay	-	Yes	CAS Bulletin in language & Literature.
9.	University of Agricultural Science, Bangalore	Yes	Yes	Publish local docu. lists
10.	Sri Venkateswara University, Tirupati	-	Yes	Publish Accession list (Recent additions monthly)

books from other stations as they do not have any system of their own for speedy communication with other libraries/universities. In the absence of communication facilities, it is not possible for any university library to have speed in their procurement. This mars or at least delays the research in various universities.

To improve upon this service, the libraries should (a) have complete rapport with the universities and specialized regional and national institutions on reciprocal basis,(b) prepare a systematic data bank and (c) efficiently provide the procured document to the researcher at a reasonably subsidised rate.

4.2 Supply of Documentation Lists/Bibliographies

The position of the supply of documentation lists/bibliographies in the Indian universities is not encouraging as only 31% of the responding libraries claim to be providing this service in one form or the other (Table 2). Other responding libraries do feel the necessity and utility of this service but have not been able to provide it for want of staff and funds. Thus, their specialised readers are deprived of making the best of the material that they have. Most of the universities providing local documentation lists either on demand or in anticipation are in specific disciplines; two universities are in agriculture, three in languages and one in social sciences. Panjab University, Chandigarh used to provide a catalogue of its doctoral awards alone which too has been suspended since 1976, and the remaining three universities publish only their new additions of books and periodicals. Thus, the service is provided just on limited scale.

4.3 Newspaper Clipping Service

This service aims at retaining clippings from newspapers which should be arranged subjectwise and chronologically. The clippings of newspapers arranged systematically would be easy for any specialist to quote, correlate, refer to or comment on the published news. The Central Institute of English and Foreign Languages, Hyderabad; G.B. Pant University,Pantnagar; Gujarat Vidyapith, Ahmedabad; JNU, New Delhi; M.U. Aurangabad; P.U.Extension Library Ludhiana and Punjabi University, Patiala are the only responding libraries which retain newspaper clippings for the use of researchers in social sciences, science & technology. It is astonishing that all universities provide ample opportunity to their students/readers for research in these fields but this very important service is not offered by 68% of the responding universities. Separate budget allocation is not made even by those universities which claim to retain these clippings.

Most of the university libraries retain the newspapers for a specified period of 3-5 years only. Still they claim to be providing this service which is in itself a conradiction. Thus, this neglected service should be given due attention so that the researcher is better equipped.

4.4 Indexing and Abstracting Service

The present study reveals that not more than 22% responding university libraries provide indexing and abstracting service. Andhra University, Waltair; Cenral Institute of English, Hyderabad; IIT Bombay; JNU New Delhi and M.U. Aurangabad are providing this service. Gujarat Vidyapith prepares abstracts of periodical articles appearing in Gujarati whereas P.U.Rxtension library Ludhiana undertook subject indexing of prominent national English dailies for the period 1965-1975 only under the title 'Indian News Index'. Regularity in the provision of this service is wanting even in these university libraries. Not a single university is making use of computer for this service. However, Central Library of Indian Institute of Technology, Bombay plans to use a computer for this service.

Most of the universities subscribe to 20 to 50 abstracting/indexing periodicals for this purpose. The use of this service to the researchers is very little if it is based on commercial periodicals only because they, particularly the foreign periodicals become obsolete when they reach the library. The position of Indian commercial periodicals is no better as they are not only irregular but there is great time lag between their publication and procurement. Hence, this service is far from satisfactory.

4.5 Reprographic Services

Table 3 gives some idea of the equipment available, personnel engaged, rates of payment, demand position and allocation of budget for reprographic services in 21 responding libraries.

Several universities have the equipment but they are not in a position to do justice to the researcher for want of trained staff and funds. The equipment available with most of the university libraries is more or less out-dated. Only two libraries have procured OCE 1250.

The microfilming facility is available with only Banaras Hindu University, Banaras; Gujarat Vidyapith Granthalaya, Ahmedabad and Maharishi Dayanand University, Rohtak. About 34% of the responding libraries do not have even the microfilm/microfische reader.

Table 3 Reprographic Services

Sl. No.	University Library	Equipment Available	Personnel		Charges	Demand Position	Allocation of Budget
			Professional	Technical	Rs.Np.		
1.	Banaras Hindu, Banaras	1. OCE 1200 2. Original copy Equipment 3. Majox Electronic Copier 1 4. Microfilming Camera Model AH5.35mm 5. Microfilming Camera Desk 16mm 6. Microfilming Reader Model AH3 7. Microfilming Reader Model PC 8. Document Printer 9. Enlarger	One	-	0.50	Heavy	7,500
2.	Central Institute of English & Foreign Languages, Hyderabad	1. Panaprint 2. Microfilm Reader	Nil	1	0.60	Very good	4,000
3.	G.B.Pant University of Agriculture and Technology, Pantnagar	1. Majox 121 2. OCE 1250, automatic photocopying equipment. 3. Microfilm Reader	One	One	nil	Heavy	20,000
4.	Gujarat Vidyapit, Ahmedabad	1. Xerox 2. Electrostyle duplicating machine 3. Micro-filming machine 4. Micro-filming Reader	One	-	0.75	500 pages per month	No separate budget
5.	Guru Nanak Dev Amritsar	1. Panaprint (Advani)Photo-copying machine 2. Microfilm Reader	One	One	0.25	Low	No separate budget
6.	Indian Institute of Technology, Bombay	1. Kores (India) Xerox Machine 2. Multi-lithographic Machine 3. Electronic Stencil Cutter 4. Cyclostyling Machine	One	Three	0.75	Heavy	Expenditure from Maintenance
7.	Jabalpur, Jabalpur	1. Majox-121	-	-	-	Not much	No separate budget
8.	Jawaharlal Nehru, New Delhi	1 Xerox 2. Microfilm Reader 3. Micro Printer/Reader		Two	0.60	-	10,000
9.	Kurukshetra, Kurukshetra	1. Electrostatic Copier Xerox Machine 2. Microfilm Reader/Projector copies	One	One	0.50	Medium	8,000
0.	Maharishi Dayanand, Rohtak	1. Majox 121 Librarian Das Reprographic 2. Microfilm Reader with Microfilm Equipment	One	-	0.50	Low	To be spent from contingency
11.	Marthawada, Aurangabad	1. Xerox	-	One	0.50	Medium	7,500
12.	Meerut, Meerut	1. Korestat Copier 2. Microfilm Reader	-	One	0.50	Very good	No separate budget
13.	North Eastern Hill, Shillong	1. Xerox	-	-	0.50	High	- do -
14.	Osmania, Hyderabad	1. Korestat 2. Microfilm Reader 3. U-Bix to be added shortly	One	One	0.50	Fairly good	7,000
15.	Punjabi, Patiala	1. Rank Xerox Major Librarian 2. Diazo Print 3. Document Printer with Microfilm Reader	One	One	0.25	Very High	10,000
16.	Sardar Patel, Vallabh Vidyanagar	1. Majox 121 Librarian Mark II 2. Microfilm Reader	Nil	two	0.75	Limited	No separate budget
17.	SNDT, Bombay	1. Xerox 2. Microfilm Reader	nil	two	0.50	High	- do -
18.	Sri Venkateswara, Tirupati	1. Panaprint with vertical and Horizontal Camera 2. Microfilm Reader	nil	One	1.00	High	5,000
19.	University of Agricultural Sciences, Bangalore	1. Korestat Copier 1971 2. Rank Zerox 2202	nil	one	0.50	Low	No separate budget
20.	University of Kashmir, Srinagar	1. Photostat	one	one	0.45	Low	1,000
21.	Vikram, Ujjain	1. Xerox	nil	nil	0.50	quite good	No separate budget

Table 4: Translation Service

Sr. No.	University Library	Translation Service	Mode of Providing Translation Service	Languages Covered	Demand Position
1.	G.B. Pant University of Agri. and Technology Pantnagar	Yes Occasionally	from other documentation centres	French	Low
2.	I.I.T. Bombay	Yes	from INSDOC on request and by its own staff of translators	French, Russian, German	High
3.	Kurukshetra University Kurukshetra	Yes	from other documentation centres	Russian, French, German	Low
4.	Osmania University,Hyderabad	Yes	By local translators from other centres	French, German Russian	Very Rare
5.	Panjab University Extension Library, Ludhiana	Yes Occasionally	By its own staff of translators	From Vernaculars into English and Vice-versa	Low
6.	Sambalpur University Sambalpur	Yes	from other documentation centres	Russian French, German	Low

Nearly ten universities have provided the library a meagre budget allocation which varies from Rs.1,000 to Rs.20,000 per annum for this service. Keeping in view the high demand and its immense utility to the researcher, purchase of most modern automatic equipment and a rethinking on the form of providing this service effectively to the users are needed so that the research material is properly preserved and document copying is facilitated with minimum transportation cost.

4.6 Translation Service

Translation service is the most neglected and ignored documentation service in the Indian universities (Table 4). Either this service is not provided at all or provided on a very limited scale. The demand is also very low because the libraries do not seem to encourage their readers for this service.

Very few libraries have their own local panel of translators, though most of the universities have departments in various Indian and foreign languages. They just get the already translated material from the national centres and supply it to the demanding researchers. This service is not popular for lack of adequate staff, budget and above all 'will to do'.

Our universities do not even cover the fifteen Indian languages included in the Eigth Schedule of the Indian constitution what to speak of a large number of foreign languages. Every language, whether Indian or foreign, has an important place for research in various disciplines as useful information is available in various languages. Thus, due attention should be paid towards this service. It will facilitate regional, national and international coordination and cooperation in research and development programmes.

4.7 Budget Allocation and Demand for Documentation Services

Table 5 provides the statistical information of the university libraries upto 28.2.1981. It gives us an exact picture of the total collection of books, periodicals, manuscripts and rare material of various libraries and the total annual budget on them separately.

No budget allocation has been made for the documentation service in most of the libraries. Only three universities out of the 32 responding universities have made a separate budget provision for the documentation services. However, the budget provision made by these universities is also very small.

Table 5: Statistical Information (Upto 28-2-1981)

Sr. No.	Name of Responding University Libraries	Total collection			Total Budget (Annual)		Docu. Services	Total	Members		Users of Docu. Services
		Books	Periodicals	Others	Books	Periodicals			Res	Fac.	
1.	Andhra, Waltair	2,97,873	1500	-	1,54,500	12,00,000	-	20,24,000	1064	1324	75%
2.	Banaras Hindu, Banaras	6,31,676	2568	-	7,75,000	12,80,000	-	20,25,000	810	533	840
3.	Bhopal, Bhopal	26,700	240	100 Mss.	1,00,000	50,000	-	1,50,000	50	300	1%
4.	G.B.Pant University of Agri.& Tech., Pantnagar	2,00,000	1400	4000(R)	5,00,000	10,00,000	15,000	20,00,000	130	500	80
5.	Gujarat, Agri. Ahmedabad	4,850	-	750(R)	70,000	30,000	-	1,00,000	10	25	-
6.	Gujarat Vidyapith, Ahmedabad	2,80,668	252	15,000(R)	4,00,000	50,000	-	9,00,000	-	-	8 to 10 per month
7.	Guru Nanak Dev, Amritsar	1,63,749	1000	5,226(R)	35,000	6,00,000	-	13,35,000	85	155	-
8.	Himachal Pradesh, Simla	1,00,000	-	500(R)	8,25,000	-	-	8,25,000	800 (Total)	-	200
9.	I.I.T. Bombay	1,08,000	1800	15,000(R)	23,00,000	- do -	-	23,00,000	400	300	300
10.	Indira Kala Sangit, Khairagarh	20,000	63	50(R)	50,000	3,000	-	-	4	30	-
11.	Jabalpur, Jabalpur	50,000	400	-	2,00,000	5,00,000	-	2,50,000	16	341	-
12.	Jawaharlal Nehru, New Delhi	2,54,000	1785	-	3,00,000	13,00,000	-	18,00,000	650	350	20 Researchers consult daily
13.	Kashmir, Kashmir	1,43,704	-	1,000(R)	6,00,000	4,00,000	-	10,00,000	-	-	-
14.	Kurukshetra, Kurukshetra	1,70,000	1400	5,000(R) 4,500(Mss)	4,30,000	4,50,000	10,000	8,00,000	194	576	150
15.	M.S.University of Baroda	3,00,000	850	2,500(R)	2,87,449 (Books & Pds)	-	-	13,66,505	226	552	-
16.	Maharishi Dayanand, Rohtak	84,135	825	400(R)	11,00,000	5,00,000	-	24,00,000	115	232	200
17.	Marthwada, Aurangabad	2,09,154	770	752(R)	5,65,000 (Including B+P)	-	-	9,15,000	65	47	25
18.	Meerut, Meerut	54,793	810	-	75,000	4,80,000	-	6,00,000	-	143	-
19.	North-Eastern Hill, Shillong	1,00,000	2000	-	10,00,000	(Books 7 Pds)	-	4,66,400	150	160	150
20.	Osmania, Hyderabad	3,65,000	-217(F)+6464(Mss)		5,00,000	7,00,000	-	19,00,000	800	1200	500
21.	Panjab, Chandigarh	4,35,000	1600	8,000(Rare) 1,400(Mss)	4,60,000	4,60,000 12,00,000	-	-	1000	300	60%
22.	Panjab University Extension Library, Ludhiana	1,00,000	350	900(R)	50,000	29,000	-	6.03lakh	162	-	-
23.	Panjabi, Patiala	2,08,099	750	5000(R)	4,60,000	5,00,000	-	15,13,800	100	565	40
24.	Sambalpur, Sambalpur	53,787	307	-	-	1,30,000	-	1,30,000	35	127	-
25.	Sardar Patel, Vallabh Vidyanagar	2,00,000	600	5,000(R)	1,00,000	1,50,000	-	4,00,000	800	300	-
26.	Shivaji, Kolhapur	1,27,257	824	1,672(R)	4,61,000	5,39,000	-	10,00,000	2142	-	127
27.	S.N.D.T.Women's, Bombay	1,28,729	400	-	77,800	40,093	-	8,93,300	40	561	15
28.	South Gujrat, Surat	73,500	690	-	9,34,000	2,75,000	-	17,83,600	53	220	10
29.	Venkateshwara, Tirupati	2,05,755	1050	-	1,60,000	5,89,000	-	13,11,000	551	354	-
30.	University of Agricultural, Bangalore	1,00,602	969	-	4,00,000	60,000	-	10,00,000	51	687	All
31.	Vikram, Ujjain	93,376	635	198(R)	1,00,000	(Books + Pds)	-	1,21,500	366	100	15 to 20 PM
32.	Central Institute of English and Foreign Languages, Hyderabad	55,522	435	-	3,20,000	80,000	Rs.5000	4,00,000	200	-	100

5. CONCLUSION

It is very interesting to note that researchers working in various disciplines in the universities are not aware of the documentation services that may be made available to them. The study reveals that eleven of the universities received no demand for documentation services. This is perhaps due to the fact that user education and training programmes have not been undertaken by any of the university libraries effectively.

No single university library, therefore, provides the facility of all the documentation services to its users. All of them have one or two services which too are not paid adequate attention. The libraries lay more emphasis on acquisition of books and periodicals rather than the very important function of dissemination of information contained in them. It is a pity because as far as collections and holdings go, some of the university libraries are having back-runs of periodicals, proceedings and transactions of learned societies and other source material which may compare with the best anywhere. But they all lie dormant because of under-utilization of resources due to the almost negligible documentation activities as this study bears out.

REFERENCES

1(a) Belio, Francis. How to cope with information. In Sharp, J.R.,ed. Readings in special librarianship, 1973.

1(b) UNESCO Statistical Year Book,1973 (Quoted in) The Bowker Annual of Library and Book Trade Information with Cumulative Index 1972-1976. Ed.21, 1976. R.R.Boker, N.Y.,pp.198--200.

2 Anand A.K. and Malhan I.V., Some investigations on resource sharing of chemistry journals for the university libraries of Punjab, Haryana, Himachal Pradesh and Chandigarh, Ann.Lib.Sci. Doc. 1982, 29(2), 76.

3 India, University Grants Commission, University and college libraries, New Delhi, University Grants Commission, 1965, p.147.

QUESTIONNAIRE

ESTABLISHMENT OF DOCUMENTATION SERVICE IN AN INDIAN UNIVERSITY

1. Does your library provide any documentation service ?	Yes/No
2 Which of the following service/Services exist in your library ?	i. Supply of documentation list on demand as well as in anticipation to supplement the other available lists. ii. Preparation, on demand from a research scholar, abstracts issues of periodicals not covered by the issue of abstracting serials received in the library. iii. Procure documents not available in the library by inter-library-loan. iv. Procure photostat or microfilm copies or other reprograph of documents on demand from research scholars. v. Arrange on demand the translation of articles in foreign languages.

REPROGRAPHIC SERVICES

1. Do you provide Reprographic Services ?	Yes/No	
2. Equipment available in your reprographic section.		
3. The strength of staff working in this section.	Professional Technical Non-technical	
4. Do you charge the cost of this service from users or render it free of cost ?	1. Readers	Yes/No
	2. Free of Cost	Yes/No
5. What are the rates of a reprograph if you charge it from the readers ?		
6. Are these rates actual or subsidized ?	Actual/Subsidized	
7. Do you provide micro-film facility ?	Yes/No	
8. Do you have micro-film reader ?	Yes/No	
9. What is the demand position of reprographic services ?		
10. What is the approximate budget of this section ?		

TRANSLATION SERVICES

1. Do you provide translation service to readers ?	
2. In case you do not provide this service, is it in demand ?	
3. What is the mode of getting translation done ?	i. By your own staff of translators. ii. By getting it done from local translators. iii. By getting it done from other documentation centres.
4. Languages for which you provide translation service.	
5. In case you get it done from other centres, kindly name the centre/libraries with which you have your rapport ?	
6. Do you charge the fee from the readers or you supply it free of cost ?	Readers/Free supply
7. If you charge, what are the rates ?	
8. Are the rates actual cost or subsidized ?	Actual/Subsidized
9. Do you subscribe cover to cover translation journal ?	Yes/No
10. Name of the journals you subscribe to	
11. What is the demand psition of this service ?	High/Medium/Low

INTER–LIBRARY–LOAN SERVICE

1. Do you have inter-library loan service ?	Yes/No	
2. Do you have rapport with all university libraries or some libraries ?		
3. What is the basis of your rapport, reciprocal or otherwise ?		
4. Who bears the postal expenses ? Please Tick	1. Readers	2. Library
5. Which class of readers are provided with this facility ?	1. Post-graduates 2. Researchers 3. Faculty Members	
6. What is the demand position of this service ?		
7. Percentage of demand i.e. met with by this service ?		
8. Do you have contacts with national or specialized institutions ? Mention the names		
9. Do you have union catalogue of periodicals prepared by ICSSR and INSDOC ?	ICSSR INSDOC	Yes/No Yes/No
10. Is your library included in these catalogues ?	ICSSR INSDOC	Yes/No Yes/No
11. Any other observation regarding inter-library loan service ?		

INDEXING AND ABSTRACTING SERVICES

1. Do you provide the service ?	Yes/No
2. Do you publish/provide documentation list/ contents of periodicals ?	Yes/No
3. Give the names of indexing periodicals subscribed by your library.	
4. Give the names of abstracting journals subscribed regularly by your library.	
5. Do you retain newspaper clippings ?	Yes/No

MISCELLANEOUS

STATISTICAL INFORMATION

1. What is the approximate number of researchers who make use of documentation service?
2. Total Budget estimate on documentation service.

3. No. of personnel engaged in the documentation service ?	1. Professional 2. Non-professional 3. Technical
4. Does this section function as a separate unit?	Yes/No
5. Your observation and suggestions in providing this	

1. Total collection of books in your library.	1. Books	2. Rarebooks
2. No.of periodicals subscribed by your library.		
3. Annual budget.	1. Books	2. Periodicals
4. Annual registration of	1. Graduates 2. Post-graduates 3. Researchers 4. Faculty members 5. Out-siders, if any	
	Grand Total	
5. Total annual budget		

Name of the library

Name of the Librarian

Name of the Officer supplying information

Designation

Signature

Dated :

Annals of Library Science and Documentation
1982,29(4), 170-175.

A TREND IN CITATION PATTERN IN ANTHROPOLOGY

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Branch Librarian
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A citation study has been made from a sample of 272 articles published in the Man in India, during 1970 to 1979 to find out the trend in citation pattern in Anthropology. The study reveals that the authors consult mostly the literature in the English language, mostly books are cited and most of them are from their own subject. Most of the citations are more than one decade old.

1 INTRODUCTION

Authors of research papers and books usually make references to earlier works to support propositions, assumptions and conclusions. The extent, frequency and period of references, in terms of old or recent, can be used as objective indicators of the spectrum of technical literature reviewed, historical perspective of a work and acquaintance with contemporary research. Thus, an analysis of trend in citation pattern acquires academic significance in revealing vital characteristics underlying the process of research activities. Being guided by this idea, a study to find out the trend in citation pattern in one of the fields of social sciences, viz. Anthropology, is being undertaken.

2. THE PROBLEM

What is the trend in the citation pattern in Anthropological researches during the past decade? Trend in citation pattern is used here in a comprehensive way. Operationally it will include the language of the referred to documents, time spread, subjects and sources of references etc.

3 METHOD AND PROCEDURE

(a) *Material*

To investigate and analyse the pattern of citations in the discipline of Anthropology, one important Indian journal in the field, viz. 'Man in India' has been chosen as the source journal. It is the oldest anthropological journal of India having commenced in 1921. Man in India is published quarterly by Man in India Office, Ranchi, Bihar (India) and was founded by Sarat Chandra Roy. The issues of the journal pertaining to the period 1970 to 1979 (Volume 50 to 59) were selected for the present study. All the bibliographical citations mentioned in the foot-notes and at the end of the articles of the issues were recorded for this study. A total number of 4087 references cited by the authors were analysed to elicit the trend in citations.

(b) *Procedure*

For the study of the physical norms of the sample, the number of articles, pages, tables, maps, pictures and graphs, appendices and notes contained in each of the articles of the issues of the journal were sorted out and frequency distributions prepared.

Every reference was classed under the following categories:

i) Kind of reference cited, viz., book, journal, thesis, report, research project, reference book, unpublished paper, letter, dissertation, government paper, court case and newspaper;

ii) The language of the cited document, whether English, German,French, Hindi, Sanskrit, Bengali, etc.;

iii) The time period of references, to find out how old or recent reference the writers cite in their articles; and

iv) The subject of reference to find out the subjects of the documents cited in the papers[1]

4 THE ANALYSIS OF DATA AND RESULTS

4.1 *General Characteristics*

On the basis of the categories of analysis mentioned above, the following results have emerged.

The data of Table 1 reveals the following facts:

(a) Number of Articles

The total number of articles cited during the whole period of 10 years is 272. This gives an average of 27.2 articles per year. Taking the sample year-wise (shown in Table 1), the range of average number of articles per issue comes to 6 to 8.25 except for the year 1974 when this average is 4.5. This indicates that the articles have been evenly distributed during this period except for one year (1974).

(b) Number of Pages

The total number of 272 articles in the whole sample comprised of 3364 pages leading to an average of 336.4 pages per year. This also gives an average of 12.37 pages per article in the sample. The range of average number of pages per issue comes to 77.00 to 93.75 except for the year 1974 when this average is 69. It indicates that the quantity of pages in the journal was evenly distributed. The data pertaining to 1974 indicates that since volume consisted of only 276 pages against the average number 336.4 pages per year, it contained lesser number of articles.

(c) Type of Researches

Two types of research approaches were found to have been employed by the contributors: (i) empirical and (ii) secondary source data analysis. Out of the total number of 272 articles, 135 (49.62%) pertain to field work, survey and case studies. They cover only 1313 pages whereas the rest of the 50.38% articles employed secondary source data analysis and comprised 2051 pages. This leads to suggest that during the period under review, theoretical (non-

Table 1: Average of articles, pages, tables, maps, appendices, notes, pictures, graphs and references per issue in each year of the sample years

S. No.	Vol.	Years	Articles		Pages		Tables		Maps		Appendices		Notes		Pictures		Graphs		References	
			Number	Average	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
1.	50	1970	29	7.25	375	93.75	94	23.5	-	-	4	1.00	78	19.5	42	10.5	-	-	248	62.00
2.	51	1971	32	8.00	339	84.75	144	36.00	-	-	1	0.25	-	-	7	1.75	3	0.75	487	121.75
3.	52	1972	33	8.25	333	83.25	68	17.00	-	-	2	0.50	2	0.50	-	-	4	1.00	394	98.5
4.	53	1973	34	8.5	391	97.75	88	22.00	3	0.75	-	-	57	14.25	-	-	4	1.00	344	86.00
5.	54	1974	18	4.5	276	69.00	44	11.00	-	-	1	0.25	32	8.00	25	6.25	-	-	278	46.00
6.	55	1975	23	5.75	331	82.75	36	9.00	1	0.25	2	0.50	23	5.75	-	-	2	0.50	643	160.75
7	56	1976	24	6.00	313	78.25	50	12.5	-	-	3	0.75	17	4.25	-	-	-	-	283	70.75
8.	57	1977	30	7.5	326	81.5	54	13.5	-	-	-	-	-	-	3	0.75	-	-	480	120.00
9.	58	1978	25	6,25	308	77.00	77	19.25	-	-	2	0.50	-	-	3	0.75	-	-	432	108.00
10.	59	1979	24	6.00	372	93.00	98	24.50	2	0.50	-	-	48	12.00	4	1.00	4	1.00	498	124.50
Total	10	10	272	-	3364	-	753	-	6	-	15	-	248	-	84	-	17	-	4087	-

empirical) research has consumed larger number of pages.

As referred above, the total number of empirical and non-empirical studies are, by and large, balanced. But the theoretical papers have consumed significantly larger printed space despite the fact that the empirical papers have made use of maps, graphs, appendices, notes, pictures etc. This leads to the obvious conclusion that during the period under review the empirical studies have been presented more concisely than the theoretical papers which seem to lack economy of presentation.

(d) *Illustrations and Tables used*

Out of the total sample of 272 articles, only 152 contain tables and out of these, 115 pertain to survey, field work and case study. Non-empirical studies have also used tabular presentation, but their number was very small. It indicates that the articles dealing with survey, field work and case study contain more tables as compared to non-survey, non-field work and non-case study articles. As such, it is the subject matter which seems to determine inclusion of tables and illustrations in an article.

4.2 *Citations*

(a) *Frequency of Citations and Relationship with Number of Articles*

The total number of articles in the sample was 272 and they contained a total number of 4087 references. This gives an average of 15.03 references per article. The volume 55 (year 1975) contains the maximum number (643) of references, whereas volume 50 (year 1970) contains the minimum number (248) of references. The former volume contains 23 articles, whereas the later one contains 29 articles. It reveals that there is no relation between the number of articles and the number of references cited in the articles. Perhaps, the nature and theme of an article determines the number of citations required. No significant rank order correlation coefficient was found between these two categories.

(b) *Type of Studies and Reference-citation*

The total number of references in the 135 empirical studies was 1233 (30.17%) and in the non-empirical studies, the number was 2854 (69.83%). This shows that the articles which pertain to survey, field work and case study contain lesser number of references. The difference is highly significant ($x^2 = 642.92$, $p \nless .001$). It seems that in the empirical area of research the concept, usage, method and interpretation of results are operationally more objective on account of methodological characteristics. Whereas, the non-empirical analytical studies greater recourse to varying views seems to be necessary to make the thesis sound.

Table 2 : Kinds of documents cited during 10 years

Sl. No.	Kinds of documents	Number of references	Percentage
1	Books	2112	51.68
2	Journal articles	1357	33.20
3	Reports	240	5.87
4	Reference books	122	2.99
5	Letters	87	2.13
6	Theses	49	1.20
7	Papers	41	1.00
8	Dissertations	25	0.61
9	Unpublished papers	23	0.56
10	Govt.papers	12	0.29
11	Court cases	11	0.27
12	Research projects	7	0.17
13	Newspapers	1	0.03
	Total	4087	100

(c) *Kinds of Documents Referred to*

Out of the total of 4087 references, 2112 (51.68%) were to books, Journal references come next, being 1357 (33.20%) only. This indicates a greater dependence on books and less on journals. Rest of the references are reports

(5.87%), reference books (2.99%), letters (2.13%), theses (1.20%), papers (1.00%), dissertations (0.61%) and unpublished papers (0.56%) etc. Newspapers (0.03%) stand in the last position among the forms of documents. Relative neglect of important sources like reports, reference books, unpublished theses and papers etc. may indicate that such materials are not easily accessible to most of the authors. Such a situation may lead to duplication of research. Lack of facilities, in the form of an agency making such literature or copies of them available seems to be the main deterrent.

(d) *Period of Time in Citations*

While analysing the sources of references, it was also considered to be relevant to analyse the time period of the reference cited—whether old or contemporary: Table 3 reveals this characteristic.

Table 3 : Period of documents

Sl. No.	Period	Number of references	Percentage
1	1900 and before	421	10.30
2	1901-1910	77	1.88
3	1911-1920	134	3.28
4	1921-1930	134	3.28
5	1931-1940	139	3.40
6	1941-1950	242	5.92
7	1951-1960	720	17.62
8	1961-1970	1506	36.85
9	1971-1980	562	13.75
10	Year not given	152	3.72
	Total	4087	100

The maximum number of references (36.85%) cited in the articles were from the period 1961-1970, i.e., one decade back from the decade of publication of the source articles. The next (17.62%) higher concentration was to the period 1951 to 1960, i.e., two decades back and only 13.75% referred to the contemporary decade (1971-1979). There were 10.30% references for the period 1900 and before. It seems that the authors had to go back for in time to dig out relevant material to their studies. Thus, 83% of the citations were pertaining to one or more decade back.

It will be interesting to investigate into the reasons for citing such large number of old references. This may be indicative of the characteristic of the subject of anthropology or may be, to a certain extent, due to the difficulties of availability of current literature or may be due to other reasons.

(e) *Linguistic Media of the Documents*

Anthropology being a cross-culturally sensitive and complementary discipline, multilingual references were expected to be referred to by the authors. Analysis of the cited references from this angle brought out the picture as given in Table 4.

Table 4 : Languages of the cited documents

Sl. No.	Language	Number of references	Percentage
1	English	3847	94.13
2	Sanskrit	135	3.30
3.	German	42	1.03
4	French	33	0.81
5	Hindi	20	0.49
6	Bengali	4	0.10
7	Japanese	3	0.08
8	Kannada	1	0.02
9	Arabic	1	0.02
10	Persian	1	0.02
	Total	4087	100

Out of 4087 references, 3847 (94.13%) were from the documents published in the English language. The second position went in favour of Sanskrit language (3.3%). It shows that the subject matter of Anthropology is traceable in Sanskrit language also. Perhaps it may shed some light on the historical perspective of some of the studies published. The Indian authors in this discipline also cite from German, French and Japanese literature for which 1.03%, 0.81% and 0.08% references are respectively found in the articles under study. Thus, this reveals that the Indian authors also consult documents in foreign languages other than English for writing their articles. Some references have also been cited from Arabic and Persian language as also from Bengali and Kannada languages. However, there is great dependence on the English language literature.

(f) Subject areas of the Referred to Documents

Analysis of the subject areas of the referred-to documents in a discipline can reveal its richness, to what extent it is endogeneous or/and exogeneous, dogmatically constricted or interdisciplinary and is absorbing relevant cross-currents from contemporary flood of knowledge in general. From this viewpoint an analysis of the references was made and this is shown in Table 5.

Table 5 : Subjects of the cited documents

Sl. No.	Subjects	Number of references	Percentage
1	Anthropology	1458	35.67
2	Sociology	1012	24.76
3	Biological & Medical Sciences	262	6.41
4	Education	246	6.02
5	General	203	4.97
6	History	179	4.38
7	Religion	162	3.96
8	Economics	135	3.30
9	Science	114	2.79
10	Archaeology	66	1.61
11	Social Sciences	64	1.57
12	Psychology	50	1.22
13	Political Science	43	1.05
14	Philosophy	27	0.66
15	Literature	20	0.49
16	Geography	17	0.42
17	Fine Arts	13	0.32
18	Linguistics	9	0.22
19	Law	4	0.10
20	Gandhism	3	0.08
	Total	4087	100

Out of the total of 4087 references, 1458 (35.67%) belong to Anthropology itself and 1012 (24.76%) to Sociology. Thus, nearly 60% of the references are from within its wider family. Biological and Medical Sciences contributed 262 (6.41%) references, Further, it is revealed that out of the total references, 246 (6.02%) belong to Education, 203 (4.97%) to general topics, 179 (4.38%) to History, 162 (3.96%) to Religion and 135 (3.3%) to Economics. The relative paucity of references from other disciplines like physiology, anatomy, psychology etc. indicates restricted academic interests of the researchers. There is plenty of scope for broadening the horizons of physical and cultural anthropology by widening its interdisciplinary dimensions to attain fuller knowledge. However, a further probe of the data revealed that there were 74 articles belonging to physical anthropology. These articles contained 810 references of which 455 (56.17%) were from Anthropology, 183 (22.59%) from Biological and Medical Sciences and 41 (5.06%) from Mathematical and Physical Sciences. This indicates wider perspective in physical anthropology.

Similar trends have been noticed by Mark in Economics, Sarles in Business Administration, Livesay in Economics and Broadus in Sociology [2]. The tendency to overdraw from one's own confinement of subject matter, as revealed in the present study, finds support in the results of Sahai (1979) who investigated in the field of Sociology [3]. It is natural that larger number of references will be from the area of the same discipline, but the share of other relevant and related disciplines in research work of a field definitely provides a cross-sectional view of the broadening or constricting horizons of study. A subject has always gained and progressed rapidly whenever diversified inquiries have been attempted getting away from the age old rigid framework of the subject. Other comparable studies in different fields *corroborate* the present citation analysis in Anthropology. Thus, it may be concluded that there is no noticeable deviation in the citations in Anthropology made by Indian scholars as compared to their peers in Sociology, Economics and Business Administration in the West.

5 CONCLUSIONS

(1) It is the nature of the subject matter of an article which determines the number of text pages and inclusion of tables, maps, graphs, appendices, notes and pictures etc. The study reveals that empirical studies are usually presented more concisely, even after including the above forms of presentation of data, than the theoretical ones.

(2) The present study reveals that it is the nature of the article which seems to determine the number of citations. The articles which pertain to survey, field study and case study (empirical) contain lesser number of references than the non-empirical ones.

(3) Books are cited more often than any other forms of document. The second position is occupied by journals. Other forms like reports, reference books, theses, dissertations and unpublished papers etc. are used by the authors scarcely.

(4) Citations are mostly more than one decade old, reaching even 50 years back from the time of publication.

(5) The authors of the articles in the source journal consulted mostly the literature written in the English language as it is more accessible language for Indian authors.

(6) Although the subject Anthropology is closely related to Sociology, the study reveals that the authors mostly consulted the literature of their own subject. The next important subject consulted, in Sociology but the anthropologists refer to Biological and Medical Sciences also in Physical Anthropology.

REFERENCES

1. Sahai, S.N. Use of information in the literature of Sociology — A study of citation pattern.Ann Lib Sci Doc,1979, 26,107
2 Broadus, R.N. The literature of the social sciences — A survey of citation studies. Int Soc Sci J, 1971, 23(2), 238.
3 Ref.1, p.109.

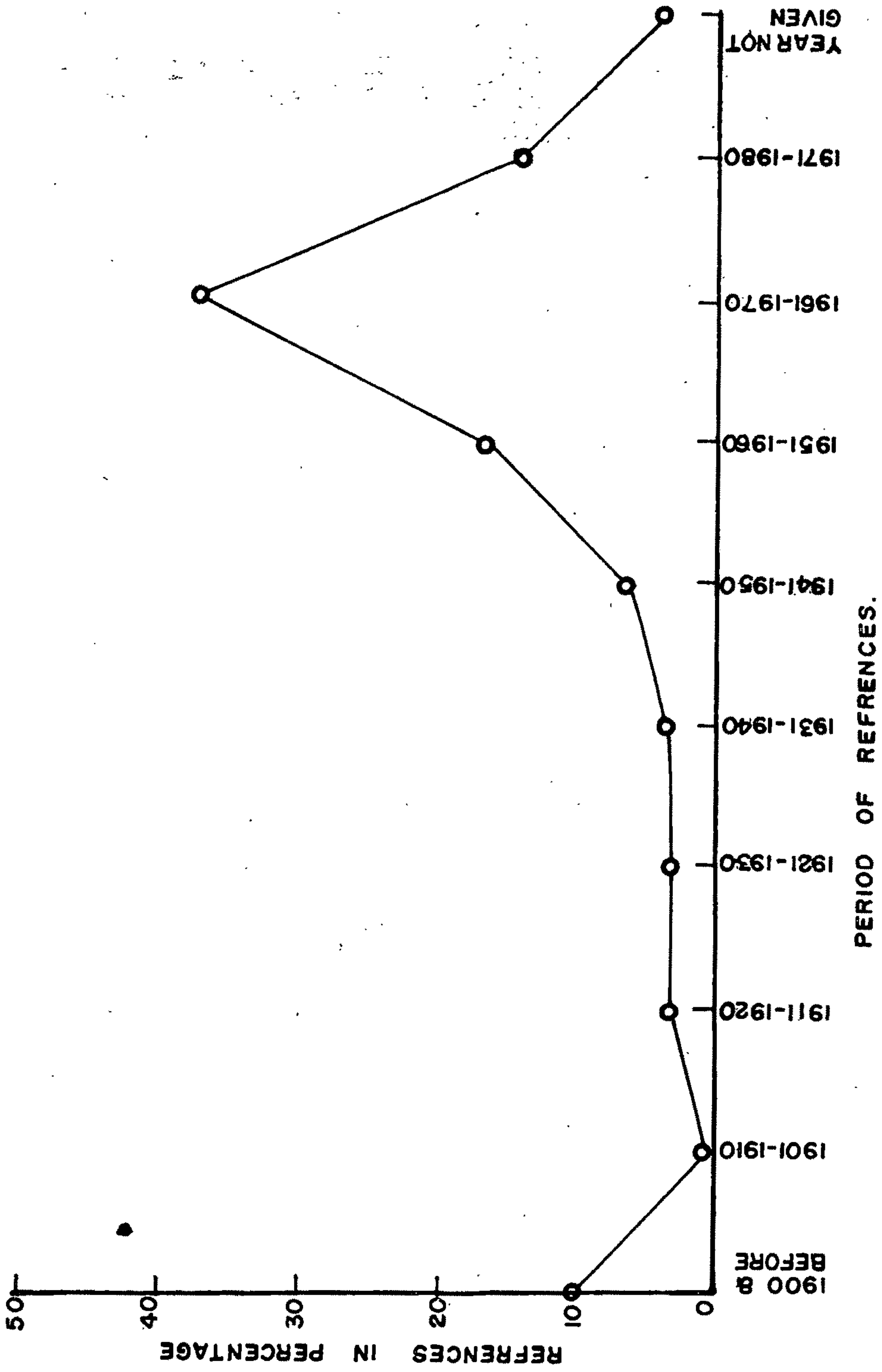

FIG.1. PERIOD OF DOCUMENTS.

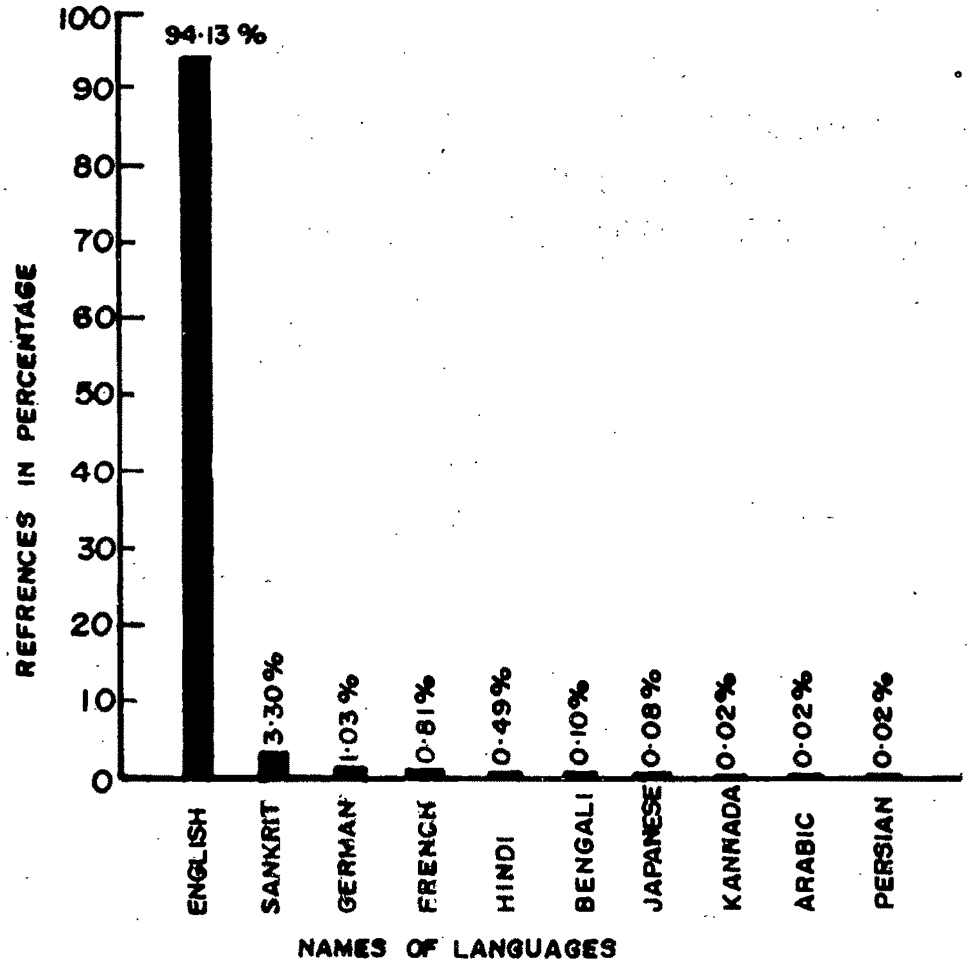

FIG. 2. LANGUAGES OF THE DOCUMENTS

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PLATE TECTONICS AND SEA-FLOOR SPREADING: A CITATION ANALYSIS STUDY FOR IDENTIFYING PERIODICAL LITERATURE

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A paper by LePichon on sea-floor spreading published in 1968 in the Journal of Geophysical Research was cited 642 times during the years 1968 to 1979. 79 journals originating from 19 countries throughout the world cited this work. The work was not only cited by the journals of geophysics and geology but by several in general science, chemistry, physics, botany, zoology etc. Wide scattering and seepage of information was observed as the citations were made in a large number of journals of various subject areas and specialities, published from so many countries. This supports the hypothesis of epidemic nature of this work of X LePichon. A list of the citing journals is presented and a group of core journals is suggested for the documentalists who are to serve the scientists in the research areas of Earth Tectonic or Geotectonics.

1 INTRODUCTION

Citation analysis is becoming an important research tool for the understanding of science, scientists, scientific contributions and publications. Citation studies and other bibliometric techniques are being applied for the management of science, analysing the structure and direction of science, measuring the utility of journals and relationships between journals and fields and measuring the performance of scientists. A vast amount of literature is getting published on such kind of evaluative studies. The literature on bibliometrics and citation indexing and analysis is well documented in a recent bibliography [6]. A comprehensive review of the whole area is available in a report [8]. Narin in his report [8] has made a thorough review of several papers in which bibliometric measures, publication and citation counts have been correlated with other measures of eminence such as awards, listings and academic rank or affiliation. In almost all cases the bibliometric measures for groups of scientists are correlating reasonably well from 0.5 to 0.8 with the other measures.

As a communication system, the network of journals play a paramount role in the exchange of scientific and technical information. Garfield has said that citation analysis could be used as a tool in evaluating and ranking the journals [1]. In his Essays [4] Garfield has reported several studies on journal citations in specific subject areas. In his Current Comments [2] there is reference to most cited journals in geology and geophysics; and also on one of the most cited journal in geophysics [3].

2 SCOPE OF THE STUDY

In this paper, an attempt is made to present data about the periodical literature which cited the most cited article of LePichon on sea-floor spreading published in the most cited journal in geophysics [3]. The data of citation analysis of LePichon's works and detailed analysis of this specific paper are reported in an earlier study [5]. The scope, definition etc. of sea-floor spreading and plate tectonics are also given in the same paper. It was found that LePichon's paper published in 1968 received 593 citations out of 1513 citations received for all his contributions. Moreover, this was not only cited heavily, but was also cited for a considerably longer period of time. To illustrate how widely LePichon's ideas, contained in this paper, have spread it was necessary to analyse the range of journal titles in which this work was cited. Therefore, the scope of the previous study was extended to examine the followings:

> the range of the journal titles which have cited this paper to prove the hypothesis that the greater the number of titles the more widely the ideas are spread;
>
> the countries in which the citing journals are published, to prove that for a set of journals, the greater the number of countries the more widely the ideas have spread;
>
> the disciplines to which the citing journals belong to prove that larger the number of disciplines (wide scattering) of the journals, wider the spread of ideas and better the interrelationship of the disciplines; (greater interaction with other fields is the measure of multidisciplinary activity of a specific field). The main purpose of this investigation was to build a model of journal communication network that should provide more functional definition of discipline (Marine geology in this case) and speciality (sea-floor spreading in this case) that will make it possible to define in detail how different fields of knowledge interact;

Further, it also aimed to make a rank list of citing journals which may be useful to scientists and documentalists who are concerned with this area of specialization.

3 METHODOLOGY

The data base which was created for a previous study to examine the epidemic nature of LePichon's paper [5] was used in this study. The analysis is extended upto 1979 in the present study. Citations were counted for the years 1968 to 1979 for LePichon's most cited paper [7] and data were collected for the titles of citing journals, kind of publications citing the paper, the year of citation etc. The information regarding the full titles, country of publication etc. was supplemented by consulting the latest edition of Ulrich's International Periodicals Directory (20th edition, 1981).

4 ANALYSIS AND DISCUSSION

The data about the forms of publications citing this work, year to year for the period 1968-1979 are given in Table 1.

4.1 *Annotations:*

1. During the period, 1968-1979, 642 citations were received by this paper.
2. the paper was very heavily cited during 1970, 1971 and 1972 receiving almost 100 citations per year on the average.
3. There is a declining trend of citations over the rest of the years but the number of citations even during the year 1979, after 11 years of its publication, is quite high, being 23.
4. Journal articles have cited it for 561 times, ie, 87.4% of all the citations;
5. Review articles are next in number, and still continuing to cite this item.

Other characteristics of citations for this paper have been already discussed in the earlier paper[5].

The data of citing journals for different periods are given in Table 2.

4.2 *Annotations: Citing journals:*

1. In all, 79 journals have cited it for 639 times. This number is quite large for a speciality like "sea-floor spreading" which is a minor aspect of marine geology and tectonics. This clearly indicates that the ideas contained in this work of LePichon were very widely cited and that confirms the hypothesis made in this study;

Table 1: Chronological distribution of citations according to the forms of citing publications:

Year of citation:	A	R	N	L	D	E	Total	percentage of total
1968	4	-	-	2	-	-	6	0.9
1969	46	-	4	11	-	-	61	9.5
1970	96	3	5	2	1	-	107	16.7
1971	90	5	3	-	1	2	101	15.7
1972	80	4	7	2	1	-	94	14.6
1973	68	3	1	1	-	-	73	11.4
1974	37	3	1	1	-	-	42	6.5
1975	31	7	-	-	-	-	38	5.9
1976	39	2	-	-	-	-	41	6.4
1977	26	-	3	1	-	-	30	4.7
1978	23	3	-	-	-	-	26	4.0
1979	21	2	-	-	-	-	23	3.7
Total	561	35	21	20	3	2	642	100.0
Percentage of total:	87.4	5.5	3.3	3.1	0.5	0.3	100.0	

2. Only a few journals, say only five of them or 6% of all have cited 343 times (53.6% of all the citations);

3. Only 12 journals (15% of all) have given upto 75% of all the citations;

4. All other journals, 67 of them carry the remaining citations in which the contributions on the topic of sea-floor spreading is scattered.

5. *Nature* in first five, *Science* in first eight, and *American Journal of Science* in first twelve titles have emerged as important journals of this speciality also. In Garfield's list [2] of most cited journals in geology and geophysics, they were listed at 5th, 3rd and 13th rank respectively while in this case *Nature* has improved its rank. Although these journals are not devoted to geology/geophysics journals, they are "general science" journals, yet they are ranked as important journals in geosciences as well as in this speciality.

Table 2: RANK LIST OF CITING JOURNALS:

S. No.		Abbreviated title of Journals	Period of Citation			Total No. citations	cumulative citations	percentage of total	cumulat. %
			1965-1969	1970-1974	1975-1979				
1		2	3	4	5	6	7	8	9
1	1	Jour Geophys Res	13	66	14	93	93	14.5	14.5
2	2	Geol Soc Amer Bull	7	65	9	81	174	12.7	27.2
3	3	Nature	9	54	3	66	240	10.3	37.5
4	4	Tectonophysics	3	30	21	54	294	8.5	46.0
5	5	Earth Planet sci lett.	8	30	11	49	343	7.7	53.7
6	6	Am Assoc Pet.Geol.Bull.	0	23	15	38	381	5.9	59.6
7	7	Geophys J Roy Astro Soc.	3	21	12	36	417	5.6	65.2
8	8	Science	10	12	1	23	440	3.6	68.8
9	9	Bull Seismol Soc.Amer.	1	8	4	13	453	2.0	70.8
10	10	Phil T Roy A	0	11	1	12	465	2.0	72.8
11	10	Amer J Sci.	0	8	4	12	477	1.9	74.7
12	12	J. Geology	1	8	2	11	488	1.7	76.4
13	13	Cr Acad Sci D	1	5	4	10	498	1.6	78.0
14	14	Can J Earth Sci	0	7	2	9	507	1.4	79.4
15	15	Marine Geology	0	4	4	8	515	1.2	80.6
16	16	Trans Amer Geophys (EOS)	0	6	1	7	522	1.1	81.7
17	17	Nz J Geology	0	3	4	7	529	1.1	82.8
18	18	Rev Geophys space Phys.	0	3	3	6	535	0.9	83.7
19	19	Rev Geog Ph	0	2	4	6	541	0.9	84.6
20	20	Deep Sea Research	2	3	0	5	546	0.8	85.4
21	20	Annals Acad Brasil	0	1	4	5	551	0.8	86.2
22	20	Geology	0	0	5	5	556	0.8	87.0
23	23	Pure App.Geophys	0	3	1	4	560	0.6	87.6
24	24	J Geomagn Geoelect.	0	3	0	3	563	0.5	88.1
25	24	Anatarctica J U.S.	0	3	0	3	566	0.5	88.6
26	24	Annual Rev Earth Planet	0	0	3	3	569	0.5	89.1
27	24	Contrib Min.Petrol	0	1	2	3	572	0.5	89.6
28	28	Naturwissen	1	1	0	2	574	0.3	89.9
29	28	J Geophysics	0	1	1	2	576	0.3	90.2
30	28	Annals de Geophysique	0	1	1	2	578	0.3	90.5
31	28	Geophysics	1	0	1	2	580	0.3	90.8
32	28	Ann Ny Acad Sci	1	1	0	2	582	0.3	91.1
33	28	Sci.J.	1	1	0	2	584	0.3	91.4
34	28	Botan Rev	0	2	0	2	586	0.3	91.7
35	28	Papers Meteorol Geophys	0	2	0	2	588	0.3	92.0
36	28	Geological Magazine	0	2	0	2	590	0.3	92.3
37	28	Earth Science Review	0	2	0	2	592	0.3	92.6
38	28	J.Fluid Mechanics	0	2	0	2	594	0.3	92.9
39	28	Economic Geology	0	1	1	2	596	0.3	93.2
40	28	J Geol Soc India	0	1	1	2	598	0.3	93.5
41	28	Palaeogeog P	0	0	2	2	600	0.3	93.8
42	28	J Petrology	0	0	2	2	602	0.3	94.1

Table 2 (Contd.)

The following 37 journals have contributed one citation each comprising total percentage 5.9 of the total: at the rank of 43:

Sl.No.		Name of the Journal
43	1.	Scientific American
44	2.	Dann SSSR SL
45	3.	Riv Ital Geo
46	4	Geofis Met.
47	5.	IBIS
48	6.	J Zoology
49	7.	Search
50	8.	Ann Geofis
51	9.	Current science
52	10	B Marine Sci
53	11.	Astro Aeron
54	12	Q Review Biol
55	13	Stud Geophys
56	14	Geoch Cos A
57	15	Annual Rev Fluid
58	16	Copeia
59	17	Annual Rev Entom
60	18	Act Cientifica Venezuela
61	19	Bioscience
62	20	Syst Zool.
63	21	Vie et Milieu
64	22	Engineering geology
65	23	American Scientist
66	24	Biol J Linn
67	25	Lithos
68	26	Okeaneologia
69	27	Report of Progress Phys.
70	28	Recherche
71	29	Annee Biol
72	30	CC/Phys Chem.
73	31	Rev Geol Dy
74	32	Phys E Plan
75	33	B CSAR Belgium
76	34	B Astr I Cz
77	35	Rev.I.F.Pet.
78	36	J Volacanology
79	37	J.Sed.Pet.

The data of citations by the publications other than the journal articles and journals in which they have been cited are presented in Table 3.

4.3 *Annotations*

1. Out of 642 citations, 562 citations are made by the journal articles and the remaining 80 by other forms like reviews, letters to editors, notes, discussions and editorials. This also confirms the hypothesis that the item has been covered by all kinds of publications. Coverage by review publications accounting for 35 citations is of considerable importance.

2. Out of 79 journals, 13 journals have cited the item only through review and notes. Out of 13, nine journals have cited the item only once in a place other than a journal article.

3. One can easily observe that the first six journals listed in Table 2, are listed in Table 3 also; and that the *Nature* is the only journal which has cited the item in its editorials.

The wide scattering of information on sea-floor spreading could be seen from the data and analysis presented above and they support the hypothesis on the epidemic nature of the ideas contained in the work of LePichon. The data on the publications from the various countries/regions are presented in Table 4. Index to the publications is given in Appendix I.

Table 3: Distribution of citations made by the publications other than the journal articles:

Journal/publication:	Review	Letters	Notes	Discussion	Editorial	T*
+ 1. Rev. Geophys	6	-	-	-	-	6
+ 2. Ann. Rev. Earth	3	-	-	-	-	3
+ 3. Botan Rev	2	-	-	-	-	2
+ 4. Earth Science Rev	2	-	-	-	-	2
5. Tectonophysics (4)	2	-	-	-	-	54
6. AAPG Bulletin (6)	2	-	1	1	-	38
7. J Geophys Res (1)	2	3	2	-	-	93
8. Amer J. Sci. (11)	1	-	-	-	-	12
+ 9. IBIS	1	-	-	-	-	1
10 Canad J Earth Sci (14)	1	1	1	-	-	9
11 Antarctica	1	-	-	-	-	3
+ 12 Astro aeron	1	-	-	-	-	1
+ 13 Q.Rev.Biol.	1	-	-	-	-	1
14 J Fluid Mech.	1	-	-	-	-	2
+ 15 Ann. Rev. Fluid	1	-	-	-	-	1
+ 16 Lithos	1	-	-	-	-	1
17 Palaegeog P	1	-	-	-	-	2
+ 18 J Volcanol	1	-	-	-	-	1
+ 19. Rep.prog.phys.	1	-	-	-	-	1
+ 19. Ann.Rev.Entomol	1	-	-	-	-	1
20 Books	3	-	-	-	-	3
21 Earth Sc.Planet lett. (5)	-	9	-	-	-	49
22 Nature (3)	-	5	-	-	2	66
23 Nz.J.Geol.	-	2	-	-	-	7
24 Geol S Am B (2)	-	-	13	-	-	81
25 Deep sea Res.	-	-	1	-	-	5
+ 26 Current science	-	-	1	-	-	1
27 Geophysics	-	-	1	-	-	2
28 Phil.T Roy Soc A	-	-	-	-	-	12
other 52 journals	-	-	-	-	-	182
Total:	35	20	20	3	2	642

T* = Total including journal articles;
+ = published only in one form, i.e., Review, Notes

Note: Within the parentheses is given the rank number of the journals.

Table 4: Country of publication of the citing journals

	Country of publication	Number of Journals	percentage of total	cumulative percentage
1.	U.S.A.	35	44.3	44.3
2.	U.K.	10	12.7	57.0
3.	The Netherlands	9	11.4	68.4
4.	France	7	8.9	77.3
5.	West Germany	3	3.4	80.7
6.	Italy	3	3.4	84.0
7.	U.S.S.R.	2	2.5	86.5
8.	Belgium	1	1.3	87.8
9.	Brazil	1	1.3	89.2
10.	Canada	1	1.3	90.5
11.	Czeckoslovakia	1	1.3	91.8
12.	India	1	1.4	93.2
13.	Japan	1	1.3	94.5
14.	NewZeland	1	1.3	95.8
15.	Norway	1	1.4	97.2
16.	Switzerland	1	1.4	98.6
17.	Venzuela	1	1.4	100.0
	Total	79	100.0	100.0

4.4 *Annotations*

1. In all, 17 countries published the 79 journals which have cited LePichon's work. The scatter of the countries of publication indicate that the ideas contained in LePichon's paper have influenced many.

The nature of the seepage of information can be estimated by considering the subject spread of the citing journals. This is shown in Table 5.

4.5 *Annotations*

1. The group of journals in general science is the largest, and many of them occupy higher ranks. This a group which serves a general population of researchers, specially to the people who are working in the areas of multidisciplinary nature. This group of journals is also a faster media of communication of recent developments in a specific field, controversial areas and issues on a specific topic. The large number of citing journals in this group indicates that idea of sea-floor spreading must have attracted the attention of scientists in many disciplines.

Table 5: Distribution of the citing journals according to subject

subject area	number of Journals	percentage of total	cumulative percentage
General Science	18	22.8	22.8
Geophysics:			
theoretical, exploration; astronomy;	15	19.0	41.8
Geology	9	11.4	53.2
Geology + Geophysics (General)	4	5.1	58.3
BIOSCIENCES:			
Biology	5	6.3	64.6
Zoology	3	3.8	68.4
Botany	1	1.3	69.7
Entomology	1	1.3	71.0
Marine geology	3	3.8	74.8
Physics	2	2.5	77.3
Fluid mechanics	2	2.5	79.8
Petroleum Geology	2	2.5	82.3
Engineering geology	1	1.3	83.6
Geochemistry	1	1.3	84.9
Petrology	1	1.3	86.8
Sedimentology	1	1.3	87.5
Oceanography*	1	1.3	88.8
Geomagnetism*	1	1.3	90.1
Volcanology*	1	1.3	91.4
Tectonophysics*	1	1.3	92.7
Seismology*	1	1.3	94.0
Meteorology*	1	1.3	95.3
Economic geology	1	1.3	96.6
Palaeogeography	1	1.3	97.9
Geography	1	1.3	99.2
Mineralogy	1	1.3	100.5
Total	79	100.0	100.0

* *Common with Geophysics also.*

2. The seepage of information can be observed from a large number of journals in the specialities of geology and geophysics, physics and other related disciplines.

3. The seepage of information through the journals in the subject areas in Biosciences and Chemistry, Geography etc, affirms the wider scope and influence of the ideas contained in LePichon's paper.

4. The analysis of this data establishes the theory of infectious and epidemic nature of the idea and also establishes the new theory of global tectonics. The subject has become now a target of research of several specialities,, forming an important and Integral part of Ocean Sciences - Tectonics.

5. CONCLUSION

1 The seepage and scattering of information through several forms of publications and in a large number of journals, journals of several disciplines and specialities, journals originating from 17 countries throughout the world, support the hypothesis that LePichon's paper contained ideas of edidemic and infectious nature.

2. A core of five most important journals can be identified out of 79 journals which have cited this work, as carrying and conveying most of the information on this speciality. The journals which have larger citing frequency are likely to contain greater amount of data and information in that specific speciality.

3. A documentation or information centre serving the needs of scientists who are working in the areas of sea-floor spreading and plate tectonics, should have at least the first fifteen journals listed in Table 2, and should also scan journals from other disciplines and specialities or make use of secondary services to supplement information needs of their users.

4. The concept of sea-floor spreading and plate tectonics appears now to have been accepted and recognised very widely among the scientists.

5. Further analysis of this data to identify the most active workers, their affiliations, network of scientists and schools of thought within this speciality would be interesting. Another area of investigation suggested is to test the applicability of Bradford's law on the citation data of this single work of epidemic nature. The data seems to be adequate enough having 642 citations to analyse.

REFERENCES

1. Garfield, Eugene. Citation analysis as a tool in journal evaluation. Science, 1972, 178(4060), 471-79.
2. ---------; Current Comments: Journal Citation Studies x. Geology and Geophysics. Current Contents, 30; 5-9; (July 24,1974).
3. ---------; Current Comments: Journal Citation Studies. xi. Journal of Geophysical Research. Current Contents. 33; 5-8? (August 14, 1974).
4. ---------; Essays of an Information Scientist. Volume 1-2. Institute for Information Science, Philadelphia, Pa.,1977.
5. Gupta, D.K. Plate Tectonics: A Study of Transmission of Ideas: Ann Lib Sci Doc, 1978, 25, 86-92.
6. Hjerppe, Roland. A bibliography of bibliometrics and citation indexing and analysis. Report TRITA–LIB–2013, RIT, Stockholm, 1978.
7. LePichon, Xavier. Sea-floor spreading and continental drift. J Geophysics Res, 1968, 73(12), 3661-97.
8. Narin, F. Evaluative bibliometric: the use of publication and citation analysis in the evaluation of scientific activity. Computer Horizon project, 1976.

Appendix-I

Index to the journals and country of publication (item numbers)

1.	U.S.A.	1,2,7,8,9,11,12,16,18,22,25,26,27,31,32,33,34,39,43,47,51,52,53,54,55,57,58,59,61,62,65,66,72,77
2.	U.K.	3,6,10,20,35,36,38,42,48,69
3.	The Netherlands	4,5,15,37,41,64,74,78,79,
4.	France	13,19,30,63,70,71,73,
5.	Italy	45,46,50
6.	West Germany	28,29,68
7.	U.S.S.R.	44,56
8.	Belgium	75
9.	Brazil	21
10.	Canada	14
11.	India	40
12.	Japan	24
13.	Newzealand	17
14.	Norway	67
15.	Switzerland	23
16.	Venezuela	60
17.	Czekoslavakia	76

Appendix-II

Index to the subjects covered (item numbers)

1.	General Science	3,8,10,11,13,21,25,28,32,33,43,44,47,49,51,60,65,70,75.
2.	Geophysics	1,7,16,18,23,24,29,30,31,46,50,53,55,74,76.
3.	Geology	2,12,14,17,19,22,36,40,45,67
4.	Geology + geophysics	5,26,37,73
5.	Botany	34
6.	Biology	54,61,63,66,71
7.	Entomology	59
8.	Zoology	48,58,62
9.	Physics	69,72
10.	Fluid Mechanics	38,57
11.	Economic geology	39
12.	Engineering geology	64
13.	Geochemistry	56
14.	Marine Geology	15,20,52
15.	Petroleum Geology	6,77
16.	Petrology	42
17.	Palaeogeography	41
18.	Mineralogy	27
19.	Sedimentology	79
20.	Geomagnetism	24
21.	Meteorology	35
22.	Oceanography	68
23.	Seismology	9
24.	Tectonophysics	4
25.	Volcanology	78

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ORGANIZATION OF INDIAN AGRO-BIOLOGICAL INFORMATION BASED UPON USERS INFORMATION NEEDS

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Characteristics of Indian agro-biological information is outlined specifying the variety of sources, variety of users and different types of information. Stresses the necessity of designing the organizational patterns of information based upon users information needs. Users information needs in Agro-biological areas are enlisted. Methodology of designing an organizational pattern is outlined. An experiment conducted at the Marathwada Agricultural University Library, Parbhani (Maharashtra) is described. Five levels of information needs of users are identified and shown schematically. It is concluded that users information needs are the deciding factors for the effectiveness of an information storage and retrieval system.

1. CHARACTERISTICS OF AGRO-BIOLOGICAL INFORMATION

Indian agro-biological information is scattered over a variety of sources, such as, books, journals, reports, schemes, current research projects, proceedings of conferences and symposia. The users of such information are also of diverse nature. On the one hand there are the specialist research workers and on the other hand there are illiterate farmers who have inherited the traditional skills and want to learn or to be trained on modern lines. In between these two groups there are the technical personnel, administrators, bankers, businessmen, industrialists, extension workers and so on. Agro-biological information covers (i) statistical data and information like climatological data; irrigation and rainfall data, crop production data; fertilizer statistica etc. (ii) Research and training information like university and college publications, journals, bulletins, research projects, newsletters, pamphlets in different languages, etc. (iii) Extension information like extension lectures, bulletins, pamphlets; transfer of technology programmes etc. (iv) Biological data and information like insect collections, germplasm collection, fungi, nematodes etc. (v) Other information like geographical information; soil profiles; physical and chemical phenomena like radiation and atomic energy applications and engineering information applied to agriculture. Agricultural information comprises not only agriculture but also animal sciences, veterinary medicine and surgery; dairy; poultry, food science and technology; home science; fisheries, sericulture, forestry, lac culture, bee culture etc.

2 BIBLIOGRAPHICAL CONTROL OF INDIAN AGRO–BIOLOGICAL INFORMATION

Bibliographical control of Indian agro-biological information can be effectively gained through sound organization of information sources based upon users information needs. Organizational pattern of information sources has always to be closely linked with users information needs. Users' approach to information should be the main criterion in framing the organizational pattern of information sources. Secondly, the efficient retrieval of information is dependent upon the sound organizational pattern of information sources. If organization is sound the retrieval of information is also efficient and quick. Therefore, users information needs, organization of information sources and efficient retrieval of information are interlinking factors in any information storage and retrieval system.

3 ORGANIZATION OF SOURCES OF INDIAN AGRO–BIOLOGICAL INFORMATION

Proper organization of information sources is an important factor for the effective retrieval. This should be based upon the users information needs.

31 Users Information needs

Users information needs in agro-biological areas may be grouped under five levels.

(i) Crop level, (ii) Subject level (both major and minor), (iii) Geographical level, (iv) Time level and (v) Author level. The importance of these levels are in descending order from Crop level to Author level.

311 *Crop level* : Agriculture is essentially a crop science. Cultivation of useful plants as crops for food and other essential commodities is the main purpose behind agriculture. Field crops like cereals, fibre crops, sugar crops, alkaloid crops, plantation crops, horticultural crops, spices, forests etc. are major crops of commercial importance. The predominant approach of an information user is to get information about the cultivation of a particular crop of his interest. Hence, organization of information should be done at its first level by the crops.

312 *Subject level* : Next approach of the users for information is the subject aspects of a particular crop – crops and their plant science, plant material, plant propagation, plant reproduction, plant genetics and breeding; physical and chemical properties of plants, histology and cytology, agronomy, farm management, farm engineering, soils, climate; cultivation methods, fertilizers, manures, nutrients, irrigation and water management, seeds and technology; harvesting, yield, storage and preservation, plant protection, plant diseases; control methods and chemicals; pests and their control methods; weeds and their control methods. Next is the basic sciences approach as a supporting one. The information on crop as a plant, morphology, anatomy, physiology, varieties, growth and growth regulators, photosynthesis, and leaf area; reproduction on both sexual and asexual; heredity and genetics etc. Soils; geographical phenomenon; soil physics; soil chemistry; soil classification; soil amendments; soil improvement; soil fertility; soil erosion and conservation; clay minerology and soil resources and management; engineering; mechanical engineering; civil engineering; irrigation engineering; farm appliances; physics and mechanics; energy; electrical energy; kinetic and potential energies; fuel; petroleum and petroleum products; oil energy; solar energy etc; atomic energy; radiation and other phenomena; climate; meteorology; oceanography; rainfall etc. The third aspect is relating to social sciences: economics; econometrics; agricultural/rural economics; production economics; prices and price policy; distribution and distribution policy; farm finance and farm credit; banks and bankers; farm management and managerial economics; labour, farm labour and their regulation, law .etc.; sociology; rural sociology; rural education; rural development; communication; migration; extension education; agricultural extension and transfer of technology for agricultural development. The fourth aspect is foods and foodstuffs; large scale manufacturing and preservation; food industries; food manufacture; food chemistry; food microbiology; food engineering; food storage; packaging etc. The fifth aspect is home science; home management; cooking; food preservation; textiles; home decoration; child psychology; child learning etc. The sixth aspect is animal sciences; domestic animals; animal management; animal nutrition; animal feeds; animal management; animal nutrition; animal feeds; animal diseases;

veterinary medicine; veterinary pathology; veterinary pharmacology; veterinary surgery etc. dairy science and technology; poultry science; fisheries; bee culture; sericulture; lac culture; forestry etc.

313 *Geographical level* : Within the subject and crop, users also look for geographical area of the information – information pertinent to a continent, country, region or in respect of particular aspect of a crop. Seasons, climatic zone, land and soil conditions of a particular region or a country may be of interest to users.

314 *Time level* : Within the levels of crop, subject and geographical area, time factor is an important consideration. Latest available information is asked for in most cases.

315 *Author level* : Author approach is of least importance when compared with other approaches.

32 *Methodology*

Method or scheme adopted for organizing the agro-biological information sources need to be based on an empirical approach. Information needs are so varied and complex that it is only through some experimentation that an useful organizational scheme or pattern may be solved. The methodology for doing this may be divided under three heads:

(i) Evaluation of information needs of users in consultation with a band of subject specialists
(ii) Preparing a schedule or scheme of organization for information sources.
(iii) Classifying the information sources with the scheme to ascertain and test its applicability.

33 *Experiment*

In 1976 at the Marathwada Agricultural University library a bibliographical Research Cell was set up in collaboration with some senior scientists. An information file has been maintained in the form of loose paper slips. As an experiment literature for ten years from 1966 onwards has been collected starting with the discipline of horticulture. Later, soil science was also covered. Then, commercial crops like oil seeds, pulses, sugarcane, have also been covered. From plant protection side, weeds and weedicides and pesticides have been added to the file. The process of updating the file and filling up the gaps have also been taken up.

Organization of information is done under four levels. (i) Crop level, (ii) Subject level, (iii) Time level, (iv) Author level.

331 *Classification schedule adopted*

(i) *Crop level* : In the discipline of horticulture, classification at crop level is done with the help of Dewey Decimal Classification, 18th edition.

(ii) *Subject level* : In the case horticulture, and other commercial crops the following scheme of subject headings are prepared basing upon the users information needs. This is done in consultation with subject specialists.

Scheme of subject headings adopted.

A	General
B	Botany
B 1	Morphology/Anatomy
B 2	Varieties
B 3	Physiology
B 31	Leaf area/Photosynthesis
B 32	Circulation
B 33	Growth/Growth regulators
B 34	Reproduction/Sexual
B 35	Plant propagation/Root stocks
B 36	Dormancy
B 37	Physiological disorders
B 4	Cytology/Histology
B 5	Genetics
B 51	Heredity
B 52	Mutation/Variation
B 53	Plant breeding
B 6	Biochemistry
C	Agronomy
C 1	Farm management
C 2	Farm engineering
C 3	Soils
C 4	Cultivation methods
C 5	Irrigation
C 6	Fertilizers, manures/nutrients
C 7	Climate/Season

C 8	Harvesting
C 9	Yield
C 10	Quality
C 11	Storage
C 12	Seeds
C 13	Preservation
D	Diseases & control
D 1	Bacterial diseases
D 11	Control methods
D 2	Viral diseases
D 21	Control methods
D 3	Fungal diseases
D 31	Control methods
E	Pests / Control methods
E 1	Insects
E 11	Control methods
E 2	Nematodes
E 21	Control methods
E 3	Molluscs
E 31	Control methods
E 4	Birds
E 41	Control methods
E 5	Mammals
E 51	Control methods
E 6	Weeds
E 61	Control methods

In the case of Soil Science the following scheme is adopted :

S 1	Soil Science (General)
S 2	Soil Physics
S 3	Soil Chemistry
S 4	Soil Biology
S 5	Soil Classification and Genesis
S 6	Soil Surveys and mapping
S 7	Soil improvement
S 8	Soil Resources and water management
S 9	Soil erosion and conservation
S 10	Clay mineralogy

In the case of Weed Science the following schedule is followed :

W 1	Generalia
W 2	Weeds and their control
W 21	Woody weeds and their control
W 22	Aquatic weeds and their control
W 23	Other weeds and their control
W 3	Weed biology
W 31	Biology of cryptogamic weeds
W 32	Biology of phanerogamic weeds
W 33	Weed taxonomy
W 34	Weed ecology
W 35	Weed anatomy
W 36	Weed physiology
W 37	Parasitic weeds
W 38	Weed predator/disease relationship
W 39	Biological control
W 4	Weedicides
W 41	Chemistry and properties
W 42	Analysis and residues
W 43	Toxicology and environment
W 44	Soil relation
W 5	Weed control in crops (Cropwise by Dewey Decimal classification 18th edition).

In the case of Pesticides the following scheme is adopted :

P	Pesticides General
P 11	Manufacture
P 12	Chemistry and properties
P 13	Analysis and residues
P 14	Toxicology and environment
P 15	Application (cropwise)
P 2	Insecticides
P 21	Manufacture
P 22	Chemistry and properties
P 23	Analysis and residues
P 22	Chemistry and properties
P 23	Analysis and residues
P 24	Toxicology and environment
P 25	Application (cropwise)
P 3	Fungicides
P 31	Manufacture
P 32	Chemistry and properties
P 33	Analysis and residues
P 34	Toxicology and environment
P 35	Application (cropwise)
P 4	Other pesticides
P 41	Manufacture
P 42	Chemistry and Properties
P 43	Analysis and residues
P 44	Toxicology and environment

P 45 Application (cropwise)
P 5 Biological control
P 51 Cropwise

(iii) Geographical level : As the information collected is of Indian work, this level is ignored while classifying the literature.

(iv) Time level : No scheme as such is adopted. Arrangement is done year wise in chronological sequence.

(v) Author level : No scheme as such is adopted. Arrangement is done by the surname/popular name of author(s) in alphabetical sequence.

The information file consists of 25,226 references and 5,272 abstracts to Indian agro-biological literature. The details of the information file and the publications brought out are outlined in another paper [2]. Organization of the information file is done with the classification schemes outlined earlier in four levels.

34 *Organizational pattern : Merits and demerits*

Classification of Indian agro-biological literature poses many problems. The existing library classification schemes do not provide solutions to all the problems. Readers often ask for approach which are not adequately provided by the classification schemes. Dewey Decimal Classification being an enumerative scheme, fails to enumerate many things, especially of agro-biological literature. Classification of microliterature needs to be done by an analyticosynthetic scheme like the Colon classification scheme. However this scheme, especially the Main Class Agriculture needs revision according to the demands of information users. The Universal Decimal Classification fails to satisfy all the demands.

341 *Crop level* : While classifying the literature at this level, Dewey Decimal classification 18th edn. is used. This scheme enumerates field crops under '633'; orchards, fruits, forestry under '634'; vegetables under '635' and ornaments under '635.9'. A number of crops grown in India are not enumerated in the schedule. Under horticultural crops, especially ornamental horticulture, the crops are not always enumerated in a helpful sequence. Under field crops, crops coming under pulses, oilseeds, spices and condiments etc. are not enumerated. It is very difficult to determine their logical place. While classifying the information some 250 crops have been identified. A separate crop schedule in a helpful sequence is now under preparation.

342 *Subject level* : While classifying the information it is observed that in the majority of cases two or more than two subject aspects are found. One major subject, one minor subject or two minor subject aspects :

Ex – Chemical changes in grape buds of Anabe–Shahi variety.

Crop heading is Grapes
Chemical changes – Biochemistry
Buds – Morphology
Anabe-Shahi – Varieties

In organizing this information it has to be decided whether it should go under Biochemistry or Morphology or Varieties? The major aspect can be Varieties or Biochemistry. The organization of this particular information either should be under Biochemistry or Varieties; preferably under Biochemistry. Varieties and Morphology could then be dealt with by the subject index.

343 *Geographical level* : This aspect is not dealt, as the information classified is relating to one country only. Classification on regional basis is not attempted.

344 *Time level* : Time factor is always very important in modern research. Users always look for current information. Hence, organization of information on the basis of time factor is useful. Year by year arrangement also quickens the process of interpolation of new information and thus updating the file.

345 *Author level* : Users' interests about the author of the information is less important than other four approaches. Therefore organization of information is done by author in the last

level. Title approach is not seen. Hence, it is not considered.

35 *Organizational pattern versus users information needs*

Users' information needs in agro-biological areas are identified in five levels in the descending order starting from Crop level to Author level. Therefore, organizational pattern of information is also done on this basis in five levels starting from Crop level to Author level. Retrieval of information can be made in the reverse manner in the ascending order starting from Author level to Crop level. In other words, information produced by a particular author, of a particular geographical area, in a particular year, of a particular subject aspect, of a particular crop can be located easily in this organizational pattern.

351 *Schematic representation*

ORGANIZATION	RETRIEVAL
Crop level	Crop level
↓	↑
Subject level	Subject level
↓	↑
Geographical level	Geographical level
↓	↑
Time level	Time level
↓	↑
Author level	Author level

4 CONCLUSION

It is emphasised that retrieval of information is effective through a sound organizational pattern of information sources based upon users information needs. The categorization of users information needs is found to be useful in organizing the agro-biological information, because retrieval of information is effective in this pattern. For example Chemical changes in grape buds of Anabe-Shahi variety under Parbhani conditions of Maharashtra (India) by V.K. Patil published in 1981 is the information required.

In organizing this information, the pattern will be as follows :

Crop	Grape
Subject	Chemical changes varieties Buds (Morphology)
Geographical	Parbhani (India)
Time	1981
Author	V.K. Patil

In retrieval, Author is the specific need whereas crop is the general need. In between, Time, Geographical location and Subject aspects fall in ascending order.

Organizational pattern is not complete by itself for effective retrieval of information. It is to be supplemented by efficient indexing policy. Organizational pattern can cover one aspect only while the other aspects should be covered by the index. A work covering two or more crops, two or more subjects, two or more geographical areas and two or more authors need to be dealt by indexing only. Crops by crop index; subjects bu subject index; Geographical areas by Geographical index and Authors by Author index.

REFERENCES

1. Phadnis, S.P. and Ahsan, Abushoib: Indian Agricultural data and information. Ann.Lib.Sc.Doc.1976, 23(1), 87-97.
2. Subbaiah, R. Towards bibliographical control of Indian agro-biological literature Ann.Lib.Sc.Doc. 1982, 29(1), 12-15.

SHORT COMMUNICATION

VASUNDHARA – A WELCOME COMPANION OF GEOSCIENTISTS

1. INTRODUCTION

Scientific knowledge is global in nature. To maintain this characteristic information scientists have the noble duty of disseminating the literature of science to the world community of scientists. Quick access to scientific knowledge has produced an unmanagably large body of scientific literature and literature of science and technology is now an intricate and often bewildering maze in which it is difficult to locate the recorded information on any given specific subject. This difficulty of bibliographic access is due to the diversity of languages, formats and media in which the information may be recorded. Secondary services provide the best guide for the location of required information.

2. SECONDARY SERVICES - WHY AND WHAT

Secondary services cover and feature sources of information in such a manner that they help: a) to make retrospective literature search and b) to satisfy current awareness needs of the scientists. These two mutually incompatible characteristics - comprehensiveness of coverage and speed of production are attempted to be met primarily in two ways:

1) by reducing the scope and coverage of secondary services; and

2) by producing separate products to meet the retrospective, and current awareness need

Different abstracting and indexing services, reviews, digests etc, serve to identify and locate the required information in the diversity of media of information transfer. But another quite different and ually significant aspect of diversity that puts a rier to free communication of information is the guage. Translation services have been designed to over this barrier.

TRANSLATION SERVICE

nslation service is designed to make supranatal ntific truth available to the scientific community of the world, transcending the linguistic barrier. The National Translation Centre (Chicago), World Translation Centre (Delft) and the British Library Lending Division are some among the organisations who have been providing such service.

In India no such elaborate attempt has yet been made to take up the responsibility of making available the scientific information published in different languages to the scientists of our country. However, the Indian National Scientific Documentation Centre (INSDOC) has been providing a translation service on the basis of "as and when required" principle. But in addition, DISDOC is recently doing a job of combining both secondary and translation service in one form. In the field of 'Natural resources and exploration'. INSDOC has been publishing a new journal - Vasundhara, which includes digest of Russian literature in the said field, translated into English.

Vasundhara contains English digests, about one third of the original paper in length, of selected Russian papers. In science and technology, specially in the field of geology, contribution of Soviet Union is quite significant in terms of both quantity and quality. Insdoc's attempt to make our scientists aware of the advancement of Soviet Union in this area, important and relevant to India, will no doubt be welcomed by them. Selection is done with the help of specialists from the wide range of Soviet scientific and technological journals received by Insdoc.

Vasundhara is unique in its field in India, and is too recent to be commented on. However, an attempt has been made to judge its probabilities and also limitations through an interview with a group of geo-scientists. All of them have unanimously welcomed its appearance and agree that Vasundhara is the first such service to open the horizon of Russian geoscientific literature to the Indian scientists. Its importance, as viewed by them, is in its awareness value.

But like any earthly material, Vasundhara has also some limitations, which may be got over gradually. Discussion with different geoscientists brought out some clear suggestions, which may be summed up in the following points.

a) Extended length of the digests serve hardly anything more than an abstract, as it is merely an awareness service and meets well the fringe interest of the enquirer. In case where the details of a paper is needed, it is not helpful.

b) References are absent in most cases, which are very helpful sources to know about the other publications on the same and related topics.

c) Natural resources and exploration is a wide subject covering almost the entire field of geology together with some other related areas. So, it is necessary to divide the subjects into some broad groups, otherwise it becomes difficult to find a required item.

d) Arrangement of the items is not helpful so as to meet the requirements of a secondary service. It should be provided with an index for easy access.

e) Proper stress is not given to all the topics within the subject field.

Despite its limitations, which can be improved in future issues, Vasundhara will soon become, we are sure, an indispensable companion to Indian geoscientists.

Smt. Bratati Niyogi
Geological Survey of India,
Calcutta

Smt. Arati Dutta
Central Reference Library
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